meta

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Volume XXVI - No. 8

AUGUST, 1953

NATIONAL METAL EXPOSITION

THE BIG METAL SHOW

Champion – in the Metals Market Place of the World!

Unmatched anywhere in the world for intensity of interest . . . for wealth of ideas and basic appeal . . . the National Metal Exposition in Cleveland's Public Hall this October, will be host to another record-breaking audience of metals industries people . . . intent upon seeing the newest . . . the finest . . . the most wanted developments America's industrial genius has created. For every man interested in metals, this champion of all industrial expositions offers *more of everything!*

CLEVELAND, OHIO • OCTOBER 19-23

Metals Review

THE NEWS DIGEST MAGAZINE

VOLUME XXVI, No. 8 August, 1953

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Vacuum-Fusion Analysis of Molybdenum, by M. W. Mallett, Assistant Supervisor, Thermal Chemistry Group, and C. B. Griffith, Battelle Memorial Institute.

Nitriding of Titanium With Ammonia, by J. L. Wyatt, Assistant to Technical Manager, Horizons, Inc., and N. J. Grant, Massachusetts Institute of Technology.

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Isothermal Transformation of Titanium-Manganese Alloys, by P. D. Frost, Assistant Supervisor, W. M. Parris and L. L. Hirsch, Research Engineers, Nonferrous Metallurgy, J. R. Doig, Research Engineer and C. M. Schwartz, Supervisor, Physics Div., Battelle Memorial Institute.

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Wednesday, Oct. 21

9:00 a. m.

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Donald S. Clark
California Institute of Technology

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The Effect of Boron on Notch Toughness and Temper Embrittlement, by A. E. Powers and R. G. Carlson, Turbine Div., General Electric Co.

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Thursday, Oct. 22

9:30 a. m.

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Organic Coatings for Severe Service, by Kenneth Tator, Kenneth Tator Associates.

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Cathodic Protection and Galvanizing, by H. A. Robinson, Chief, Chemical Section, Metallurgical Laboratories, Dow Chemical Co.

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Electrodeposited Coatings, by Fielding Ogburn, Chemist, National Bureau of Standards, Electrodeposition Section, Division of Chemistry.

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Basic Concepts of Fatigue Damage in Metals, by T. J. Dolan, Research Professor of Theoretical and Applied Mechanics, University of Illinois.

Fatigue Failure Under Resonant Vibration Conditions, by B. J. Lazan, Director of Engineering Experiment Station, University of Minnesota.

8:00 p. m.

Fatigue Characteristics of Large Sections, by O. J. Horger, Chief Engineer, Railway Division, Timken Roller Bearing Co.

Institute of Metals Division A.I.M.E.

Allerton Hotel
Cleveland, Ohio
Oct. 19-21, 1953

Monday, Oct. 19

9:30 a. m.

(Two Simultaneous Sessions)

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Plastic Deformation of Iron Between 300° and 77.2° K., by Donald F. Gibbons, Royal Military College of Canada.

Deformation of Ferrite Single Crystals, by F. L. Vogel, Jr., and R. M. Brick, University of Pennsylvania.

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Grain Boundary Attack on Aluminum in Hydrochloric Acid and Sodium Hydroxide, by E. C. W. Perryman, Aluminum Laboratories Ltd.

Microscopical Examination of Tin Bronzes in the Alpha Range, by E. C. W. Perryman, Aluminum Laboratories Ltd.

Identification of the Precipitate Accompanying 885° F. Embrittlement in Chromium Steels, by R. M. Fisher, E. J. Dulis and K. G. Carroll, U. S. Steel Corp.

Measurement of Particle Sizes in Opaque Bodies, by R. L. Fullman, General Electric Co.

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2:00 p.m.

(Three Simultaneous Sessions)

PLASTIC DEFORMATION

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Orientation Relationships in the Recrystallization of Deformed Copper Single Crystals, by J. J. Becker, General Electric Research Lab., and J. N. Hobstetter, Bell Telephone Labs.

Plastic Deformation of Rectangular Zinc Monocrystals, by John J. Gilman, Columbia University.

Variation of Plastic Properties With Annealing Procedure in Zinc Single Crystals, by Choh Hsien Li, Jack Washburn and Earl R. Parker, University of California.

Recovery in Single Crystals of Zinc, by R. Drouard, Paris, Jack Washburn and Earl R. Parker, University of California.

Some Observations on the Work Hardening of Metals, by E. H. Edwards, Jack Washburn and E. R. Parker, University of California.

THERMODYNAMICS

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Vapor Pressure of Silver, by C. L. McCabe and C. E. Birchenall, Carnegie Institute of Technology.

High Pressure Oxidation Rate of Metals—Copper in Oxygen, by William McKewan, New Jersey Zinc Co. of Pennsylvania, and W. Martin Fassell, Jr., University of Utah.

Self-Diffusion of Iron in Iron Oxides and the Wagner Theory of Oxidation, by L. Himmel and R. F. Mehl, Carnegie Institute of Technology, and C. E. Birchenall, Princeton University.

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System Titanium-Chromium-Iron, by R. J. VanThyne, H. D. Kessler and M. Hansen, Armour Research Foundation of Illinois Institute of Technology.

Molybdenum Boron Systems, by P. W. Gilles and B. D. Pollock, University of Kansas.

Vanadium-Uranium Constitutional Diagram, by H. A. Saller and F. A. Rough, Battelle Memorial Institute.

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B. L. Averbach, Moderator

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Interfacial Energy and Recrystallization, by Cyril Stanley Smith.

Recovery, by B. L. Averbach.

Stored Energy and Recrystallization, by E. E. Stansbury.

Significance of Activation Energies, by D. Turnbull.

Recrystallization as a Nucleation and Growth Process, by J. E. Burke.

Textures and Recrystallization, by Robert Maddin.

Tuesday, Oct. 20

9:00 a.m.

(Two Simultaneous Sessions)

TRANSFORMATION

Silver-Cadmium Eutectoid, by G. R. Speich, Westinghouse Electric Corp., and D. J. Mack, University of Wisconsin.

Diffusionless Phase Change in the Indium Thallium System, by M. W. Burkart and T. A. Read, Columbia University.

On the Theory of the Formation of Martensite, by M. S. Wechsler, D. S. Lieberman and T. A. Read, Columbia University.

Rate of Propagation of Martensite, by R. F. Bunshah and R. F. Mehl, Carnegie Institute of Technology.

Rate of Formation of Isothermal Martensite in Fe-Ni-Mn Alloy, by R. E. Cech and J. H. Hollomon, General Electric Co.

Calculation of Martensite Nucleus Energy Using the Reaction-Path Model, by J. C. Fisher and D. Turnbull, General Electric Co.

Martensite Nucleation in Substitutional Iron Alloys, by John C. Fisher, General Electric Co.

Stabilization of the Austenite-Martensite Reaction in a High Chromium Steel, by S. C. Das Gupta and B. S. Lement, Massachusetts Institute of Technology.

SYMPOSIUM ON PHYSICAL METALLURGY OF TITANIUM AND ITS ALLOYS

M. A. Hunter and H. A. Jackson, Chairmen

Effect of Hydrogen on Mechanical Properties of Titanium, by G. A. Lenning, C. M. Craighead and R. I. Jaffee, Battelle Memorial Institute.

Initial Experience With a New Type Titanium Alloy—the All-Alpha, by W. L. Finlay and R. W. Parcel, Rem-Cru Titanium Inc., and R. C. Durstein.

INSTITUTE OF METALS DIVISION A.I.M.E. *(Continued)*

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Research and Development Program Sponsored by Wright Air Development Center, by E. J. Hassell, Wright Air Development Center.

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(Three Simultaneous Sessions)

TITANIUM SYMPOSIUM
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Titanium Base Alloys for Elevated Temperatures, by Harold Kessler, Armour Research Foundation.

Influence of Metallurgical Factors on the Mechanical Properties of Titanium Alloys, by Schuyler Heries, Titanium Metals Corp. of America.

Heat Treatment, Structure and Mechanical Properties of Titanium Manganese Alloys, by F. C. Holden, H. R. Ogden and R. I. Jaffee, Battelle Memorial Institute.

Heat Treatment and Alloying of Titanium, by L. D. Jaffee, Watertown Arsenal Laboratory.

RESEARCH IN PROGRESS

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Solid State Bonding of Aluminum and Nickel, by S. Storchheim, J. L. Zambrow and H. H. Hausner, Sylvania Electric Products, Inc.

Grain Boundary Creep, by F. N. Rhines, Carnegie Institute of Technology.

The Spread in Orientations Among Microregions in Cast and Deformed Crystals, by W. C. Ellis, Bell Telephone Laboratories, Inc.

Growth Structures Formed During the Solidification of Metal Crystals, by C. Elbaum and B. Chalmers, Harvard University.

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Mechanism of Plastic Flow in Titanium at Low and High Temperatures, by F. D. Rosi and F. C. Perkins, Sylvania Electric Products Inc.

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Kink Band Formation in High Purity Aluminum During Creep at High Temperature, by A. M. Gervais, Societe Commentry-Fouchambault et Decazeville, J. T. Norton and N. J. Grant, Massachusetts Institute of Technology.

Subgrain Formation in High-Purity Aluminum During Creep at High Temperatures, by Andre M. Gervais, Societe Commentry-Fouchambault et Decazeville, John T. Norton and Nicholas J. Grant, Massachusetts Institute of Technology.

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Creep Behavior of Extruded Electrolytic Magnesium, by C. S. Roberts, Dow Chemical Co.

Further Progress in the Development of Mg-Zr Alloys to Give Good Creep and Fatigue Properties Between 500° and 650° F., by C. J. P. Ball, A. C. Jessup, P. A. Fisher, D. J. Whitehead and J. B. Wilson, Magnesium Elektron Ltd.

Properties of Sand Cast Magnesium-Thorium Zinc-Zirconium Alloys, by K. E. Nelson, Dow Chemical Co.

A Rationalization of Measured High-Temperature Properties of Fe-Cr-Co-Ni Alloys, by J. D. Nisbet and W. R. Hibbard, Jr., General Electric Co.

Wednesday, Oct. 21

2:00 p.m.

(Three Simultaneous Sessions)

PLASTIC DEFORMATION OF TITANIUM, MOLYBDENUM AND ZIRCONIUM

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Cold Rolled Texture of Titanium, by D. N. Williams and D. S. Eppelsheimer, University of Missouri.

Effects of Solid Solution Alloying on the Cold-Rolled Texture of Titanium, by Carl J. McHargue, University of Kentucky, Sam E. Adair, Jr., Linde Air Products, and Joseph P. Hammond, Univ. of Kentucky.

Textures of Rolled and Annealed Iodide Zirconium, by J. H. Keeler, W. R. Hibbard, Jr., and B. F. Decker, General Electric Co.

PHYSICAL METALLURGY

Effects of Macrostructure on the Performance of Alnico Permanent Magnets, by Dolph G. Ebeling, General Electric Co., and A. A. Burr, Rensselaer Polytechnic Institute.

Densification and Kinetics of Grain Growth During the Sintering of Chromium Carbide, by H. J. Hamjian, Utica Drop Forge and Tool Corp., and W. G. Lidman, Sylvania Electric Products Inc.

Influence of Aluminum and Silicon Deoxidation on the Strain Aging of Low-Carbon Steels, by W. C. Leslie and R. L. Rickett, U. S. Steel.

Age Softening of Beta Brass, by Harry Green, Horizons Inc., and Norman Brown, University of Pennsylvania.

Anelastic Behavior of Pure Gold Wire, by Donald R. Mash and Lewis D. Hall, Stanford University.

Some Properties of Columbium Containing Nitrogen, by Choh-Yi Ang and Charles Wert, Univ. of Ill.

Electrical Resistivity of Liquid Metals and of Dilute Liquid Metallic Solutions, by E. Scala, Chase Brass & Copper Co., and W. D. Robertson, Yale University.

POWDER METALLURGY SEMINAR

Society for Nondestructive Testing

Tentative Technical Program

Hotel Hollenden

Oct. 19-22, 1953

Monday, Oct. 19

9:00 a. m.

Opening Address by Robert C. McMaster, National President of the Society for Nondestructive Testing.

Ten Years With the American Society for Metals, by speakers from A.S.M. and S.N.T.

2:00 p. m.

Radiography Session, by speakers from Los Alamos Scientific Laboratory.

All Day

Educational Lecture Series (Chairman: Sam Wenk)

Tuesday, Oct. 20

9:00 a. m.

Betatron Session, by speakers from Brown, Bovery & Co., Allis Chalmers, General Electric Co., and Los Alamos Scientific Laboratory.

2:00 p. m.

deForest Award

Coolidge Award

Mehl Lecture—**Field Application of Radiography,** by A. Morrison.

Evening

Social Hour, organized by the Cleveland Section S.N.T.

Wednesday, Oct. 21

7:30 a. m.

Breakfast Meeting for Members

9:00 a. m.

Management and Foreign Speakers

2:00 p. m.

Ultrasonics Session (Chairman: W. C. Hitt; Co-Chairman: John Smack)

Thursday, Oct. 22

9:00 a. m.

Magnetic and Fluorescent Particle Inspection. (Chairman: Hamilton Migel)

1:30 p. m.

Eddy Current and Related Subjects. (Chairman: H. N. Staats)

American Welding Society

Tentative Technical Program
National Fall Meeting
Hotel Cleveland, Cleveland, Ohio
Oct. 19-23, 1953

Monday, Oct. 19

Morning

AWARDING OF PRIZES

ADAMS LECTURE

Aspects of Welding Research in British Merchant Shipbuilding, by R. B. Shepheard, The Shipbuilding Conference

Afternoon

(Two Simultaneous Sessions)

GOUGING AND CUTTING

The Arcair Process, by Myron D. Stepath, Arcair Co.

Shielded Metal-Arc Cutting and Grooving, by Helmut Thielsch and J. Quaas, Eutectic Welding Alloys Corp.

Advanced Automatic Flame Cutting for Machinery Weldments, by Howard B. Cary, Marion Power Shovel Co.

RESISTANCE WELDING

Radiography of Spot Welds, by Robert C. McMaster, Battelle Memorial Institute.

Resistance Welding in Jet Engine Manufacturing, by Frank J. Wallace, Pratt and Whitney Aircraft Div. of UAC

A Study of the Cooling Rates in Flash Welds in Steel, by Ernest F. Nippes, Warren F. Savage and Gordon Grotke, Rensselaer Polytechnic Institute.

Some Application of High-Speed Motion Picture Photography to Resistance Welding, by I. S. Goodman, Westinghouse Electric Corp.

Evening

PRESIDENT'S RECEPTION

NATIONAL OFFICERS DINNER

Tuesday, Oct. 20

Morning

(Three Simultaneous Sessions)

STAINLESS STEEL

Effect of Various Heat Treatments on Modified 347 Weld Deposits, by R. D. Thomas, Jr. and Lorin K. Poole, Arcos Corp.

Silver Brazing Alloys for Corrosion Resistant Joints in Stainless Steels, by George H. Sistare, Handy & Harman, L. H. Grenell, General Motors Corp., and John J. Halbig, Armco Steel Corp.

Submerged Arc Welding of Chromium Bearing Steels, by Clarence E. Jackson and Arthur E. Shrubsall, Union Carbide & Carbon Labs.

TITANIUM

Tension, Shear and Impact Strengths of Spot-Welded Titanium Joints, by M. L. Begeman, E. H. Block, Jr., and Frank W. McBee, Jr., University of Texas.

Fusion Welding Commercially Pure Titanium, by Francis H. Stevenson, Aerojet General Corp.

Alloy Filler Metals in Commercially Pure Titanium, by Carl E. Hartbower, Watertown Arsenal Lab.

STRUCTURAL

Residual Stress and Inelastic Bending of WF Columns, by Robert L. Ketter, Lynn S. Beedle, Lehigh University, and E. L. Kaminsky, David Taylor Model Basin.

Weldability of Structural Steel Discussed From the Viewpoint of Federal Agencies, by E. L. Erickson, Chief, Bridge Branch, Bureau of Public Roads.

Development of Welded Bridge Construction, by N. W. Moran, Principal Highway Bridge Engineer, Bureau of Public Roads.

Recent Applications of Welded Design to Industrial Building Framings, by A. Amirikian and E. G. Odley, Bureau of Yards and Docks, Navy Department.

Afternoon

(Two Simultaneous Sessions)

ALUMINUM AND AIRCRAFT

Soldering of Aluminum, by James D. Dowd, Aluminum Co. of America.

Fatigue Strength of Welded Butt Joints in ⅛-in. Thick Aluminum Alloy Plates, by E. C. Hartmann, Marshall Holt and I. D. Eaton, Aluminum Co. of America.

Some Considerations on Weldability of Aluminum Alloys, by J. Koziarski, Piasecki Helicopter Corp.

WELDABILITY

Cracking in High-Temperature Alloys as Related to Microstructure, by W. R. Apblett and W. S. Pellini, Naval Research Laboratory.

Ductility Transition Characteristics of Weld Metal, by Earl Eschbacher and W. S. Pellini, Naval Research Laboratory.

Further Studies on Weld-Metal Microcracking in Mild Steel, by A. E. Flanigan, University of California.

Wednesday, Oct. 21

Morning

(Three Simultaneous Sessions)

WELDABILITY

Army First Pass Groove Weld Crack Susceptibility Test, by Z. J. Fabrykowski, S. Goodman and B. A. Schevo, Detroit Arsenal.

Low-Temperature Bend-Test Properties of Bead-on-Plate Welds, by L. A. Harris, R. B. Matthiesen and N. M. Newmark, University of Illinois.

Fatigue Properties of Weld Metal, by L. A. Harris, R. B. Matthiesen and N. M. Newmark, University of Illinois.

TITANIUM

A Study of the Weld Heat-Affected Zones in Titanium Alloys, by Ernest F. Nippes, John M. Gerken and Bernard W. Schaaf, Rensselaer Polytechnic Institute.

Welding Characteristics of Titanium and Titanium Alloys, by Mario L. Ochieano, Lockheed Aircraft Corp.

Study of the Effects of Alloying Elements on the Weldability of Titanium Sheet, by Max Hansen, Armour Research Foundation.

CONTROLS AND INSPECTION

Inspection Techniques for Quality Welding Production, by Lew Gilbert, *Industry* and *Welding,* and W. B. Bunn, M. W. Kellogg Co.

Nondestructive Testing as an Aid to the Increased Use of Welding for Steel Structures, by Lloyd J. Oye, Magnaflux Corp.

Tolerances on Fillet Welds, by John Mikulak, and Merle B. Dillman, Worthington Corp.

Afternoon

(Three Simultaneous Sessions)

PIPE

Further Studies of the Arc Welding of Low-Chromium Molybdenum Steel Pipe, by J. Bland, Standard Oil Co. (Ind.)

Superheaters for 1100 to 1500° F. Test Installation, by Bela Ronay and W. E. Clautice, U. S. Naval Engineering Experiment Station.

Carbide Segregation and Decarburization at Welded Joints, by I. A. Rohrig, Detroit Edison Co., and H. S. Blumberg, M. W. Kellogg Co.

RESEARCH

Welding Metallurgy of Nodular Cast Iron, by Edward E. Hucke and H. Udin, Massachusetts Institute of Technology.

The Effect of Low-Temperature Stress Relieving on Stress-Corrosion Cracking of Mild Steel, by C. R. McKinsey, Union Carbide & Carbon Research Labs.

Transformation of Cr-Mo Steels During Welding, by W. R. Apblett, Jr., R. P. Dunphy and W. S. Pellini, Naval Research Laboratory.

Multiple Contact Resistance, by W. B. Kouwenhoven and Donald R. Hagner, Johns Hopkins University.

EDUCATION

Teaching Engineering Fundamentals, by S. Hollister, Cornell University. Discussion: W. B. Kouwenhoven, Johns Hopkins University and R. S. Green, Ohio State University

Teaching Welding Design, by J. P. Vidosic.

Evening

SECTION OFFICERS DINNER

Thursday, Oct. 22

Morning

(Three Simultaneous Sessions)

PRESSURE VESSELS AND RESEARCH

Plastic Fatigue Strength of Pressure Vessel Steels, by Robert D. Stout, John H. Gross and D. E. Gucer, Lehigh University.

A Qualitative Study of Residual Stresses in Welds by Photoelasticity, by Melvin Mark, Raytheon Mfg. Co.

Effect of Nitrogen and Carbon Dioxide Atmospheres on Arc Welding, by Profs. Sowa, Truckenmiller and Wagner, University of Michigan.

Biaxial Fatigue Properties of Pressure-Vessel Steels, by T. J. Dolan and C. E. Bowman, University of Illinois.

INERT ARC WELDING

Inert-Gas-Shielded Metal-Arc Welding of Low-Carbon Steels, by G. C. Christopher and R. C. Becker, Intrenational Harvester Co.

Characteristics of Consumable-Electrode Inert Arcs, by R. W. Tuthill, General Electric Co.

Effect of Power Supply Characteristics on Sigma Welding, by W. H. Helmbrecht, and R. L. Hackman, Linde Air Products Co.

Weld Properties of a Carbon-Steel Electrode for Use With Inert Gas Shields, by Harry C. Cook, and Gilbert R. Rothschild, Air Reduction Research Laboratories.

AUTOMATIC ARC

New Developments in Fluxes for Automatic Welding and Hard Surfacing, by L. K. Stringham, Lincoln Electric Co.

Multiple Electrode Welding by the Unionmelt Process, by D. E. Knight, Linde Air Products Co.

Multiple-Arc Submerged Arc Welding, by Theodore Ashton, Lincoln Electric Co.

Afternoon

BOARD OF DIRECTORS MEETING

ANNUAL BUSINESS MEETING

Evening

ANNUAL DINNER

Friday, Oct. 23

Morning

(Three Simultaneius Sessions)

APPLICATIONS

New Welding Shop Facilities, Methods and Equipment at the Whiting Refinery, by Ray M. Kobl and R. C. Wheeler, Standard Oil Co. (Ind.).

Silver and Gold for Brazing Electronic Components, by A. W. Swift and R. J. Metzler, Handy & Harman.

New Results in Tool and Die Welding, by Robert H. Groman, Eutectic Welding Alloys Corp.

Austenitic Manganese Steel Welding Electrodes, by Howard S. Avery and Henry J. Chapin, American Brake Shoe Co.

INERT ARC WELDING

A New Method to Prevent Rectification of Current and High-Frequency Interference in Inert-Gas Arc Welding, by John Murray, Lincoln Electric Co.

New Developments in Sigma Welding of Carbon Steel, by T. McElrath, Jr. and R. T. Telford, Linde Air Products Co.

Porosity in the Welding of Carbon Steel, by Glenn W. Oyler and Robert D. Stout, Lehigh University.

FIELD-ERECTED STRUCTURES

Scale Effects in Notch Brittleness, by Yoshio Akita, Transportation Technical Research Institute.

Effect of Subcritical Heat Treatment on the Transition Temperature of a Ship Plate Steel, by E. B. Evans and L. J. Klingler, Case Institute of Technology.

Welded Mexican Bridge, by T. C. Kavanagh, New York University.

Fall Meeting Planned and Sponsored Jointly by Metals Division and Metals Section of Science Technology Division

SPECIAL LIBRARIES ASSOCIATION

Tentative Program ***Cleveland, Oct. 21-23, 1953***

Wednesday, Oct. 21

Columbus, Ohio

Field Trip to Battelle Memorial Institute to inspect library and research facilities of the Institute.

Thursday, Oct. 22

Cleveland, Ohio

Public Auditorium

9:30 a. m.

NEW DEVELOPMENTS IN METAL

New Techniques in Welding, by P. T. Stroup, Chief of the Process Metallurgy Division, Aluminum Co. of America.

Developments in Machining Processes, by Warner Seely, Vice-President, Public Relations, Warner and Swasey Co.

Services Available From Large Libraries and Specialized Agencies— Speaker to be announced.

2:00 p. m.

FUNDAMENTALS OF THE NEWER METALS*

Materials for Use at Elevated Temperatures, by W. J. Harris, Executive Secretary, Minerals and Metals Advisory Board, National Academy of Sciences, Washington, D. C.

Metallic Materials for Nuclear Reactors, by Frank G. Foote, Director, Metallurgical Division, Argonne National Laboratory.

6:00 p. m.

Dinner With Cleveland Chapter of S.L.A.

8:15 p. m.

Improvement of Reading Speed and Efficiency, by Harold Johnson, Director of Reading Improvement Clinic, Case Institute of Technology.

10:00 a. m.

Operations Research as a Metallurgical Tool, by C. West Churchman, Case Institute of Technology.

Techniques in Report Writing, by Robert LeFevre Shurter, Professor of English and Director of Division of Humanities and Social Studies, Case Institute of Technology.

12:30 p. m.

Luncheon and Inspection Trip to Warner & Swasey Co.

*Papers on the Thursday morning and afternoon session will be presented from a fundamental viewpoint so as to be understandable to librarians who do not have engineering training in metallurgy. Literature sources on the subjects being discussed will be stressed in all of the papers.

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TEXAS	W. Mack Crook 4101 San Jacinto Houston 4, Tex.	Arthur R. Oakley, Jr. 812 Woodstock St. Bellaire, Tex.	Donald E. Wilson Cameron Iron Works, Inc. P.O. Box 1212 Houston 1, Texas	
TOLEDO	E. C. Kron Doehler-Jarvis Corp. Toledo 1, Ohio	J. E. Preas 2533 Portsmouth Toledo 13, Ohio	R. W. Furman, Jr. 2271 Castlewood Dr. Toledo 12, Ohio	
TRI-CITY	C. Hibbard Savery French & Hecht Div. Kelsey-Hayes Wheel Co. Davenport, Iowa	Victor H. Vieths, Jr. 2316 N. Howell St. Davenport, Iowa	Ralph W. Rogers, Jr. Aluminum Co. of America Davenport, Iowa	
TULSA	Theodore N. Duncan Tulsa Winch, Div. of Vickers, Inc. Tulsa, Okla.	George E. Sykora P.O. Box 1991 Tulsa, Okla.	R. J. Cottingim Box 5358 Donalson Station Tulsa, Okla.	
UTAH	Orson H. Davenport Linde Air Products Co. 362 Pierpont Ave. Salt Lake City, Utah	Heber C. Brimley 1614 Walker Bank Bldg. Salt Lake City 1, Utah	H. E. Flanders University of Utah Metallurgical Dept. Salt Lake City, Utah	
VIRGINIA POLYTECHNIC INSTITUTE	John W. York Saltville, Va.		Edward C. VanReuth Box 6067 Virginia Tech. Station Blacksburg, Va.	
WARREN	C. H. Carleton 166 Adelaide Ave., S.E. Warren, Ohio	L. D. Dunlap 897 Trumbull Ave., S.E. Warren, Ohio	Harold O. Ripple R.F.D. 5, Box 12 Warren, Ohio	
WASHINGTON	H. N. Arbuthnot Allegheny Ludlum Steel Co. 1001 15th St., N.W. Washington 5, D. C.	Richard E. Wiley 5941 N. 10th Rd. Arlington, Va.	Melvin R. Meyerson National Bureau of Standards N.W. Bldg., Room 208 Washington 25, D. C.	
WESTERN ONTARIO	Percy E. Banwell Walker Metal Products Ltd. Kildare Rd. Walkerville, Ont.	Trevor F. Heard 39 Walbrook Cres. London, Ont.	R. T. Herdegen, Jr. 225 McMillan Rd. Grosse Pointe 30, Mich.	Raymond E. Barton Canadian Mines Equipment Ltd. 596 Hamilton Rd. London, Ont.
WEST MICHIGAN	J. D. Fitzpatrick Kaydon Eng. Corp. P.O. Box 688 Muskegon, Mich.	John J. Kenny, Jr. 1347 Union Ave., N.E. Grand Rapids 5, Mich.	John B. Powers 1511 Roosevelt Rd. Muskegon Hgts., Mich.	
WICHITA	Robert E. Layton 144 N. Clifton Wichita, Kan.	Eldon E. VanMeter 155 S. Chautauqua Wichita, Kan.	Louis G. Montre 1002 Parker Wichita 3, Kan.	Arvid A. Melby 1558 N. Belmont Wichita 14, Kan.
WORCESTER	Harold J. Elmendorf American Steel & Wire Spring Mill Worcester, Mass.	Joseph C. Danec Norton Abrasive Co. 1 New Bond St. Worcester 6, Mass.	Lincoln G. Shaw 15 South St. Auburn, Mass.	
YORK	Donald Sener 619 S. 25th St. Harrisburg, Pa.	Raymond W. Musser 43 Manor Ave. Millersville, Lancaster Co., Pa.	Roy E. Livingstone 1717 Stanton St. York, Pa.	

Chapter Officers' Gavels Change

(Left) Past Chairman Dean W. Thompson, Welcomes the New Officers of the Ft. Wayne Chapter. From left are: Mr. Thompson; Alden D. Carvin, Joslyn Mfg. & Supply Co., treasurer; Paul A. Lauletta, Joslyn Mfg. & Supply Co., chairman; and Fred K. Jaessing, U. S. Rubber Co., vice - chairman. (Below) Chicago's new officers are, from left: Otto Zmeskal, Illinois Institute of Technology, chairman; Joe Kubik, Stewart Warner Co., vice-chairman; Paul Zimmerman, Joseph T. Ryerson & Son, Inc., secretary - treasurer; and Charles R. Lake, Eclipse Fuel Eng. the assistant secretary

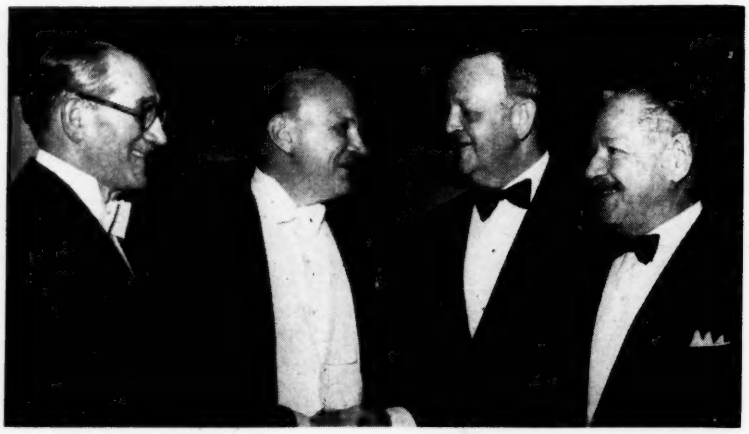
(Below—Left) Newly Elected Chairman of the Saginaw Valley Chapter, A. D. Moore, is Congratulated by Retiring Chairman, F. L. Mackin, General Motors Institute of Technology. Mr. Moore is secretary of the magnesium standards committee, Dow Chemical Co. T. E. Leonitis and R. S. Haverberg were elected vice-chairman and secretary-treasurer, respectively. (Below—Right) G. E. Mason (left), past-chairman of the Manitoba Chapter, was presented with an inscribed desk set by incoming chairman J. P. Oswald. R. Walker and S. R. Channing were elected to the posts of vice-chairman and secretary - treasurer, respectively

Hands to Start 1953-54 Season

(Right) J. M. Beyerstedt, Past Chairman, Welcomes Incoming Officers of the Milwaukee Chapter. From left are: W. D. Trueblood, Leeds & Northrup Co., vice-chairman; Mr. Beyerstedt; E. Gammeter, Globe Steel Tubes Co., chairman; and E. G. Guenther, Wisconsin Motors Corp., secretary - treasurer. (Below) Worcester's new officers include, from left: H. D. Berry, Thomas Smith Co., second vice-chairman; L. G. Shaw, Pratt & Inman, secretary-treasurer; H. J. Elmendorf, American Steel & Wire Co., chairman; J. C. Danec, Norton Co., Baer - Manning Overseas; W. Johnson, past chairman

(Below — Left) Retiring Chairman Milton W. Phair, Tennessee Coal and Iron Division, U. S. Steel Corp., Hands Charter and Gavel of the Texas Chapter to W. Mack Crook (left), Consulting Engineer, Incoming Chairman. (Below—Right) New York Chapter's incoming chairman, Neal Russell (left), Vanadium-Alloys Steel Co., is shown receiving the Chapter gavel from Joseph J. Preisler, Sperry Gyroscope Co., retiring chairman. Also elected were W. A. Stadtler, International Business Machines Co., vice-chairman; F. Wright, Lucius Pitkin, Inc., treasurer; and G. F. Geiger, International Nickel Co., Inc., secretary

A.S.M. Secretary Is Guest in London



During His Recent Trip to Great Britain and the Continent to Develop Plans for the Next World Metallurgical Congress, William H. Eisenman (Right), A. S.M. National Secretary, Attended a Meeting of the Iron and Steel Institute in London. With Mr. Eisenman are, from left; George S. Rose, secretary of the American Iron and Steel Institue; Howard Biers, American Institute of Mining and Metallurgical Engineers; and Sir Lewis Jones, J. P., secretary of the South Wales Siemens Steel Association

Importance of Quality Controls Stressed by Hood

Reported by J. G. Christ
Metallurgical Application Section
Westinghouse Electric Corp.

J. W. Hood, head of the quality standards department of the Aluminum Co. of America's Metallurgical Division, addressed the Pittsburgh Chapter on "Quality Control".

The speaker described how the manufacturing field for aluminum and aluminum products has grown with respect to the number of alloys available and their forms, properties and finishes. The importance of the inspector in the aluminum industry was very strongly emphasized. The inspector was described as serving both as the customer's representative and as the barometer of efficiency and quality for the factory. Where more than one plant makes the same product, Alcoa has what they refer to as interplant specifications or special practice methods to assure that all plants inspect to the same standard.

A number of inspection methods which are basic to the industry were discussed. Most important and most revolutionary among these has been the introduction of ultrasonic testing. Until the introduction of this method of testing, the interior of all aluminum forms was pretty much a mystery, unless said material was destructively tested. Now, however, any customer can examine the internal structure of the types of material to which ultrasonic testing is applicable in its present state of development. This inspection method has shown where improvements need to be made, and Alcoa has actively prosecuted an extensive research and development program based on the results of ultrasonic examination.

Statistical quality control is used in all Alcoa plants. Alcoa believes that 100% inspection does not automatically mean 100% quality assurance, and that properly designed sampling plans are much more effective in certain applications. Where trouble is encountered, steps are taken for further inspection and investigation. It has also been found that informing workers of quality results by means of charts has helped to improve the quality of production.

A number of finishes have been developed for aluminum. They have not only served to protect and beautify the aluminum product, but have been found to be very sensitive to surface conditions so that in a sense they are inspection detectives.

The Aluminum Co. of America, in spite of the job they are doing inspection-wise, still require the inspection assistance of their customers. To this end, they have field inspectors that report on the difficulties that customers are having with aluminum material. For example, at the present time all automobile pistons are made of aluminum, and it has been by close cooperation with the automotive companies, who do the machining on the pistons, that the quality of the product has been improved.

Mr. Hood concluded with the comment that poor quality control is poor business. It means wasted labor and therefore necessitates higher prices for a given product and, on a national scale, is one of the things that results in inflation.

New Films

Electrical Wiring

The latest in the Aluminum Co. of America's series on how-to-do-it motion pictures for users of aluminum, "Electrical Wiring With Alcoa Aluminum", has recently been released. The film was designed for the man on the job and deals almost entirely with techniques of handling and joining in installing aluminum conduit, cable and wire. It serves as an instruction medium for electricians and technical trainees, and an introduction for all persons in the electrical field in the use of aluminum conductors.

The film is available through Alcoa sales offices or upon direct request to: Motion Picture Division, Aluminum Co. of America, 818 Alcoa Bldg., Pittsburgh 19, Pa. An estimate of potential audience should accompany film-showing requests.

♦ ♦ ♦

A Better Way

A film sponsored by the United States Steel Corp., to be shown to mill operating personnel, describes methods improvements which have been accomplished, and motivates plant men to devise and suggest others. Further information about this film may be obtained from: Wilding Picture Productions, Inc., 1010 Euclid Bldg., Cleveland Ohio.

♦ ♦ ♦

Heavy Bulk Materials Handling Equipment

A 16-mm. full sound and color picture on "Heavy Bulk Materials Handling Equipment" has been produced by Heyl & Patterson, Inc. The film deals with the handling and transportation of ore and coal from the mine to final use. It is available to industrial and engineering groups upon request without charge. Further information may be obtained by writing to: Heyl & Patterson, Inc., 55 Water St., Pittsburgh 22, Pa.

IMPORTANT MEETINGS *for September*

Aug. 31-Sept. 5—American Mathematical Society. 58th Summer Meeting. Kingston, Ont., Canada. (Lucille Charron, secretary, A.M.S., 80 Waterman St., Providence 6, R. I.)

Sept. 1-4—American Institute of Electrical Engineers. Pacific General Meeting, Hotel Vancouver, B. C. (H. H. Henline, Secretary A.I.E.E., 33 W. 39th St., New York 18, N. Y.)

Sept. 13-16—Electrochemical Society. 104th Meeting, Wrightsville Beach, N. C. (F. W. Fink, Chairman, Corrosion Division, Electrochemical Society, Battelle Memorial Institute, Columbus 1, Ohio)

Sept. 21-25—Instrument Society of America. Eighth National Instrument Conference and Exhibit, Hotel Sherman, Chicago, Ill. (Richard Rimbach, Secretary, I.S.A., 921 Ridge Ave., Pittsburgh 12, Pa.)

Rocky Mt. Honors Member-Speaker

The Rocky Mountain Chapter Honored Ray McBrian, Speaker, Chairman of the Program Committee, and Past Chapter Chairman, at a Recent Meeting. Shown are, from left: S. Mark Davidson, treasurer; Mr. McBrian; Curtis Drake, past chairman; Robert Stark, vice-chairman; and George Lundberg, past chairman. Mr. McBrian spoke on "Rail Problems in the Moffat Tunnel"

Reported by Clyde O. Penny

Metallurgist

Denver & Rio Grande Western Railroad

Ray McBrian, engineer of standards and research, Denver & Rio Grande Western Railroad, spoke before the Rocky Mountain Chapter on "Rail Problems in the Moffat Tunnel". Mr. McBrian, one of the founders of the Chapter, who has ably served in every Chapter office over the past 13 years, was presented with an engraved desk set by the Chapter in recognition of his services.

Mr. McBrian described the Moffat Tunnel as the "great corrosion test laboratory". With steam engines operating through the tunnel, the humidity remains near 100% all the time. Corrosion problems encountered in the tunnel operation are of the nature of corrosion-abrasion of the running surface of the rail, stress corrosion, electrolytic corrosion between rail and fastenings, and general over-all corrosion.

To reduce joint failures and eliminate badly battered joint conditions from the corrosion-abrasion problem, the rail in the tunnel was replaced in 1938, by using 39 and 60 ft. lengths welded together by the thermit processes. Stress corrosion cracking of some welds, coupled with heavy corrosion wear, necessitated replacement of the rail in 1943, at which time the 39 ft. lengths were again welded together by the thermit process. At this time, all welds were radiographed, using 250 mg. of radium as the source.

Rail was again replaced in the tunnel in 1950, when 39 ft. lengths were welded together by the gas pressure welding process. Again, all welds were radoigraphed using 500 millicuries of radioactive Colbalt-60 as the source, thus reducing exposure time by 50%. Mr. McBrian pointed out that with the advent of diesel operation, the corrosion problems in the tunnel have been materially reduced, the major problems now being abrasion-corrosion and electrolytic corrosion.

OBITUARIES

G. W. McLeary

G. W. McLeary, superintendent, Shawinigan Chemicals Ltd., Shawinigan Falls, Quebec, died early in July in Canada. He was a member of the Montreal Chapter.

Jack H. Steckla

Jack H. Steckla, 36, general superintendent of the Jackson plant of the Pittsburgh Forgings Co., died suddenly of a heart attack the early part of June. He had been at the Coraopolis plant in the metallurgical department before going to Jackson five years ago.

George A. Challen

George A. Challen of George A. Challen & Co. Ltd., Montreal, died on June 27.

Industrial Furnace Assoc. Holds Spring Meeting

The recent Annual Spring Meeting of the Industrial Furnace Manufacturers Association, Inc., held in Hot Springs, Va., broke all previous attendance records. Talks included on the programs were:

E. A. Schoefer, executive vice-president of the Alloy Casting Institute, spoke on "Research Projects in Developing Low-Nickel Alloys"; William Adam, chairman of the Association's Government Liaison Committee, gave a report on the aims and purposes of his committee; Kirtland Marsh of Aluminum Co. of America, delivered a paper on "Heat Transfer Rates to Aluminum"; and Neil Carothers, chief economic advisor, U.N. Civil Assistance Command, talked on "Korea and the American Economy".

Opens New Branch Offices

To further extend its service in the midwest to meet increased customer demands, P. R. Mallory & Co. Inc., Indianapolis, has setablished branch offices in Dayton, Ohio, and Milwaukee, Wis. Establishment of the new branches will facilitate service to customers in those areas previously served from the Indianapolis and Chicago offices.

Names New Distributor

Meier Brass & Copper Co., Detroit, has been appointed as a distributor of Reynolds aluminum by the Reynolds Metals Co. Meier will stock aluminum wire, rod and bar in standard alloys and tempers, and will handle cast plate and bar for tools, dies and fixtures in a wide range of sizes.

A.E.C. Advisory Committee on Tour

On Tour of the General Electric Co.'s Hanford (Wash.) Atomic Products Operation Are Members of the U. S. Atomic Energy Commission's Advisory Committee on Industrial Information. The group is concerned with advising the AEC on dissemination of unclassified technological information to industry. Receiving badges to enter one of the Areas are, from left: Karl T. Schwartzwalder, American Ceramic Society, Inc.; Elmer Hutchisson, editor, Journal of Applied Physics; *Norman Jacobson, chief of AEC's Industrial Information Branch; Murray Nash of AEC's Office of Classification; Walter E. Jessup, editor of* Civil Engineering; *Andrew W. Kramer, editor of* Power Engineering; *and chairman E. E. Thum, editor,* Metal Progress *(Photograph courtesy of General Electric Co.'s Hanford Atomic Products Operation)*

A. S. M. Review of Current Metal Literature

An Annotated Survey of Engineering, Scientific and Industrial Journals and Books Here and Abroad Received During the Past Month

Prepared in the Library of Battelle Memorial Institute, Columbus, Ohio

Stewart J. Stockett, Technical Abstracter

Assisted by Claudia Carter, Ardeth Holmes, Norma King and Members of the Translation Group

A GENERAL METALLURGICAL

161-A. Wage Incentive for Cost and Production Control for Indirect Operators. C. J. Pruet. American Foundrymen's Society, Preprint 53-1, 1953, 8 p.

Application of complete indirect wage incentive plan. "Indirect work" is defined as the type of work required to indirectly assist or service the employees who perform direct work, eg. janitors, stock men, etc. (A6)

162-A. Are Your Costs Reliable? R. T. Lewis. American Foundrymen's Society, Preprint 53-59, 1953, 4 p.

Somon common discrepancies inherent in costs developed from inadequate and incorrect cost systems of today. (A6)

163-A. High Output of Quality Gears Requires Tailor-Made Shop. H. J. Bates. *Iron Age,* v. 171, June 4, 1953, p. 141-145.

Plant layout in which there is coordination between design, heat treating, and production departments. Diagrams, photographs. (A5, J general)

164-A. Total Supply of Copper Available, Including Foreign Metal, Likely to Meet Demand in U. S. Louis S. Cates. *Metals,* v. 23, May 1953, p. 7, 11.

Reports that clearing up of confused price situation will take time and that scrap has moved more freely to refineries following end of controls. (A4, A8, Cu)

165-A. Sliding Scale Import Tax on Lead, Zinc Would be Detrimental to the Best Interests of U. S. Kenneth C. Brownell. *Metals,* v. 23, May 1953, p. 8.

Market conditions. (A4, Pb, Zn)

166-A. Domestic Zinc Output and Imports to Result in Surplus Supply of 76,000 Tons This Year. Howard L. Young. *Metals,* v. 23, May 1953, p. 9-10.

Factors which influence market forecasting. (A4, Zn)

167-A. U. K. to End Bulk Buying of Copper and Resume Free Trading on London Metal Exchange Aug. 5. L. H. Tarring. *Metals,* v. 23, May 1953, p. 12-13.

Statistics for United Kingdom. Cu, Sn, Pb, and Zn. (A4, Cu, Sn, Pb, Zn)

168-A. Gold. E. Baliol Scott. *Mining Journal* (London), Annual Review, May 1953, p. 7.

Russia's output, industry in South Africa, price, and principal producers. (A4, Au)

169-A. Silver. E. Baliol Scott. *Mining Journal* (London), Annual Review, May 1953, p. 9.

Production, prices, and consumption. (A4, Ag)

170-A. The Platinum Metals. *Mining Journal* (London), Annual Review, May 1953, p. 11.

Production and price. (A4, EG-c)

171-A. Copper. E. Baliol Scott. *Mining Journal* (London), Annual Review, May 1953, p. 13, 15.

Major producers. (A4, Cu)

172-A. Tin. Ursel Baliol Scott. *Mining Journal* (London), Annual Review, May 1953, p. 17, 19.

Production, consumption, and world's smelter capacity. (A4, Sn)

173-A. Lead. *Mining Journal* (London), Annual Review, May 1953, p. 21.

Influence of easing free market and re-opening Metal Exchange. Considers supply and demand in U. S. and world output. (A4, Pb)

174-A. Zinc. *Mining Journal* (London), Annual Review, May 1953, p. 23.

1952 Zn situation. (A4, Zn)

175-A. Aluminium. A. Graham Thomson. *Mining Journal* (London), Annual Review, May 1953, p. 27, 29.

Production in 1952. (A4, Al)

The coding symbols at the end of the abstracts refer to the ASM-SLA Metallurgical Literature Classification. For details write to the American Society for Metals, 7301 Euclid Ave., Cleveland 3, Ohio.

176-A. Magnesium. *Mining Journal* (London), Annual Review, May 1953, p. 30.

Excess U. S. production and position in United Kingdom. (A4, Mg)

177-A. Titanium. *Mining Journal* (London), Annual Review, May 1953, p. 31.

1952 production. (A4, Ti)

178-A. Antimony. *Mining Journal* (London), Annual Review, May 1953, p. 35.

Considers falling prices and possibility of increasing stockpiles. (A4, Sb)

179-A. Nickel. A. Graham Thomson. *Mining Journal* (London), Annual Review, May 1953, p. 37.

Production and prices. (A4, Ni)

180-A. Chromium. *Mining Journal* (London), Annual Review, May 1953, p. 38.

World producers. (A4, Cr)

181-A. Cobalt. *Mining Journal* (London), Annual Review, May 1953, p. 39.

1952 supply. (A4, Co)

182-A. Manganese. *Mining Journal* (London), Annual Review, May 1953, p. 41.

Position in U. S. (A4, Mn)

183-A. Tungsten, Molybdenum and Vanadium. *Mining Journal* (London), Annual Review, May 1953, p. 42-43.

Position of each. (A4, W, Mo, V)

184-A. Beryllium. *Mining Journal* (London), Annual Review, May 1953, p. 45.

Production in U. S., Brazil, and Southern Africa. (A4, Be)

185-A. Columbium and Tantalum. *Mining Journal* (London), Annual Review, May 1953, p. 47.

Exploitation of sources. (A4, Cb, Ta)

186-A. Iron and Steel. *Mining Journal* (London), Annual Review, May 1953, p. 49, 51.

Output expansion, activity in Western Europe, problems of the British industry, coking capacity, and expansion of pig iron production. (A4, D1, CI, ST)

187-A. Developments in Production of Alloys. A. E. Williams. *Mining Journal* (London), Annual Review, May 1953, p. 105-107.

Developments in cast iron, alloy steels, nitriding process, creep resistant alloys, Ni-Al bronzes, Ni-Ag, foundry practice, and die casting. (A general, J28, E general, Cu, CI, AY)

188-A. Air Conditioning Gives You Fast Money Return. H. P. Bailey. *Power,* v. 97, June 1953, p. 73-75.

Advantages and costs of installing air conditioning in metalworking plants. Photographs. (A7)

189-A. Pre-Planning Doubles New Plant's Output. *Steel,* v. 132, June 1, 1953, p. 110-112.

Savings and production increases for a manufacturer of spray painting equipment and water cooling towers resulted from planned process layout, building architecture, and engineering. Photographs. (A5)

190-A. Hubbard and Company. 110 Years of Expansion. Harold C. Hood. *Steel Processing,* v. 39, May 1953, p. 225-241.

Origin and growth of a large producer of high-quality forged and machined items. Manufacture of pole-line hardware, tapered Al tubing products, and tools are included. Photographs. (A5, T6, Al, Cu, ST)

191-A. A Special Survey of the Shotton Works of John Summers and Sons, Limited. *British Steelmaker,* v. 19, May 1953, p. 231-246, 249-299, 301-325, 327-340.

A century of steelmaking; blast furnace plant; coke ovens and by-product plant; new steel plant; power supply and distribution; works' services; rail traffic layout and operation; 42-in. slabbing mill; continuous hot strip mill; cold reduction and ancillary processes; galvanizing, finishing, and packing; progress in metallurgical and chemical control; personnel and welfare; and review of plant equipment. Photographs. (A5, D general, F general, ST)

192-A. Uranium in Canada 1952. A. H. Lang. *Canadian Mining and Metallurgical Bulletin,* v. 46, May 1953, p. 309-314.

Canadian production and development work on U. (A4, U)

193-A. Presidential Address to the Institution of Metallurgists. L. B. Pfeil. *Engineering,* v. 175, May 22, 1953, p. 651-652.

Metallurgical developments in the last 30 years. (A2)

194-A. Why. Where. How. Dust Control in Metalworking Shops. James R. Kayse. *Machine and Tool Blue Book,* v. 49, June 1953, p. 160-166, 168.

Dust control systems for cut-off wheels, machine tools, metal cleaning operations, metal spraying, and welding. Tables, photographs. (A5)

195-A. Metalworking Plant Squeezes "Juice" From Scrap. Operation Returns a Profit. James Joseph. *Machine and Tool Blue Book,* v. 49, June 1953, p. 170-172, 174.

Process for recovery of cutting oils from Al and steel chips. Photographs. (A8, Al, CN)

196-A. Protect Yourself Now Against Future Materials Shortages. John Kelso. *Product Engineering,* v. 24, June 1953, p. 146-149.

Fundamental approaches to materials conservation with supplemental information on current government controls. Graphs. (A general)

197-A. (German.) **Structure and Development of Iron, Sheet, and Metal-Wares Industry.** Erhard Wunsch. *Metall,* v. 7, nos. 7-8, Apr. 1953, p. 285-291.

Industrial aspects and trade developments. Graphs, tables. (A4, Fe)

198-A. (German.) **Slackening in Economy of Cu Raw Materials.** Richard Broh. *Metall,* v. 7, nos. 7-8, Apr. 1953, p. 293-294.

Cu supply of various countries. (A4, Cu)

199-A. (German.) **Production and Working of Metals in Brazil.** Hans Link. *Metall,* v. 7, nos. 7-8, Apr. 1953, p. 294.

Increasing self-sufficiency efforts of Brazil. (A4, Cu, Zn, Al, Sn, Ni, Pb)

200-A. (German.) **Socialization of Indonesian Tin Industry.** *Metall,* v. 7, nos. 7-8, Apr. 1953, p. 295.

Financial-control measures. (A4, Sn)

201-A. (German.) **Radiation Damage to Eyes of Metal Workers.** W. Schweissheimer. *Metall,* v. 7, nos. 7-8, Apr. 1953, p. 296.

Industrial injury by ultraviolet and infrared rays from various sources. (A7)

202-A. (German.) **Excess of Aluminum in England.** *Metall,* v. 7, nos. 7-8, Apr. 1953, p. 296.

Market shift and its effect on labor. (A4, Al)

203-A. (German.) **Electrical Equipment for Cranes Iron and Steel Works.** Hermann Enke. *Stahl und Eisen,* v. 73, no. 9, Apr. 23, 1953, p. 528-538.

Increasing safety of control operations by means of semi-automatic gear. Photographs, diagrams, tables. 6 ref. (A5)

204-A. (German.) **Recent Developments in Design of Iron and Steel Works Cranes.** Hellmut Ernst. *Stahl und Eisen,* v. 73, no. 9, Apr. 23, 1953, p. 538-545.

Evolution of mechanical and electrical components. Photographs, diagrams. 9 ref. (A5)

205-A. (German.) **Innovations in Crane Design and Efforts to Improve and Simplify Their Construction.** Erich Kemana. *Stahl und Eisen,* v. 73, no. 9, Apr. 23, 1953, p. 545-556.

Overcoming obstacles in design improvements. (A5)

206-A. Electromagnetic Pumps for High-Temperature Liquid Metal. J. F. Cage, Jr. *Mechanical Engineering,* v. 75, June 1953, p. 467-471.

Different types of electromagnetic pumps which utilize "motor" principle. Graphs, photographs. (A5)

207-A. Guide for Stainless Steel Buyers. *Steel,* v. 132, sec. 2, June 22, 1953, p. 1-160.

Sizes and types of stainless in tabulated form, with list of producers. (A10, SS)

208-A. (French.) **Tendencies of Technical Research in French Ferrous Metallurgy.** H. Malcor. *Métallurgie,* v. 85, no. 3, Mar. 1953, p. 159-161, 163, 165.

Present and future problems of the industry. (A9, Fe)

209-A. (French.) **Management and Organization of Metallurgical Concerns.** P. Lamy. *Métallurgie,* v. 85, no. 3, Mar. 1953, p. 219, 221, 223.

Functions of the commercial service, its "tools", and its relations to manufacturing and bookkeeping. (To be continued.) (A5)

210-A. (German.) **The Bull Market in Tungsten Capsized.** *Metall,* v. 7, nos. 9-10, May 1953, p. 376.

Market responses. (A4, W)

211-A. (German.) **Position and Economic Importance of Antimony.** Walter Gehr. *Metall,* v. 7, nos. 9-10, May 1953, p. 377-379.

Occurrence, production, important ore producers, smelting production, exporting countries, world reserves, prices, and future developments. Tabulations. (A4, Sb)

212-A. (German.) **Maneuvers and Conversions in the Metal Industry, 1950-1952.** *Metall,* v. 7, nos. 9-10, May 1953, p. 380-381.

General economic picture and specific economy of metals. Tables. (A4)

213-A. (German.) **Is Overproduction of Aluminum to be Expected.** E. Rauch. *Metall,* v. 7, nos. 9-10, May 1953, p. 382-383.

Statistics for various countries and Europe in general. (A4, Al)

214-A. (German.) **The State as Contractor in Metals.** *Metall,* v. 7, nos. 9-10, May 1953, p. 384.

Socialization in metals production. (A4)

215-A. (German.) **Signs of a Bear Market in World Metals.** *Metall,* v. 7, nos. 9-10, May 1953, p. 385-386.

Picture for Cu, Zn, Pb, Sn, and Al. (A4, Cu, Zn, Pb, Sn, Al)

216-A. (German.) **The West German Metals Market.** *Metall,* v. 7, nos. 9-10, May 1953, p. 386-387.

Status of Cu, Zn, Pb, Sn, and Al. (A4, Cu, Zn, Pb, Sn, Al)

217-A. (German.) **The European Community's Common Market in Coal and Steel.** Franz Etzel. *Stahl und Eisen,* v. 73, no. 11, May 21, 1953, p. 689-696.

Presents the essence and aims of the common market by defining terms; economic fundamentals; individual demands; customs, storage, and transfer problems; and future prospects. (A4, A5, ST)

218-A. (German.) **Recovery of Copper in the Production of Copper Fibers.** Franz Gerstner. *Zeitschrift für Elektrochemie; Berichte der Bunsengesellschaft für physikalische Chemie,* v. 57, no. 3, 1953, p. 221-225; disc., p. 225.

Shows how copper in "blue water" from the production of cuprammonium silk can be recovered by means of ion exchange. Tables, graphs. 12 ref. (A8, Cu)

219-A. (German.) **Small Iron Industry as a Feeder to Heavy Industry.** E. Schrieder. *Zeitschrift des Vereines deutscher Ingenieure (VDI),* v. 95, nos. 14-15, May 15, 1953, p. 462-464.

Draws line between types of manufacturing undertaken in "light" and "heavy" industry. Diagrams. 5 ref. (A5)

220-A. (Book.) **Introductory Engineering Materials.** Irving H. Cowdrey and E. L. Bartholomew, Jr. 424 p. McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York 36, N. Y. $6.00.

Materials, what they are, and the relationships between structures, treatments, and properties. Photomicrographs of metallic structures are used to show how internal structures result from certain composition and properties, and in turn determine the mass characteristics. (A general)

221-A. (Book.) **Tool Engineers Data Book.** G. J. Gruen. 219 p. 1953. Reinhold Publishing Corp., 330 W. 42nd St., New York 36, N. Y. $5.50.

Data on general properties of special alloys, heat treatment of special alloys and stainless steels, and spot identification of metals. Includes conversion tables, mathematical tables, and glossary of metallurgical terms. (A general, Q general, J general, S10, S22)

B

RAW MATERIALS AND ORE PREPARATION

117-B. Improving Stainless Steel. *Business Week,* June 6, 1953, p. 92, 97-98.

Describes purification of Nb, Mn, and Cr for addition to steel. Photographs. (D22, SS)

118-B. Rare Earths in Stainless Brought Up to Date. *Iron Age,* v. 171, June 4, 1953, p. 148-149.

Summary of AISI paper, "Use of Rare Earth Metals and Compounds in Stainless Steel Melting" by C. P. Post and H. O. Beaver. Briefly describes effects. (B22, D general, SS, EG-g)

119-B. Progress in Mineral Dressing. F. B. Michell. *Mining Journal* (London), Annual Review, May 1953, p. 81, 83, 85, 87, 89, 91.

Developments in crushing, screening, washing, scrubbing, grinding, classification, gravity concentration, flotation, separation, and mechanical picking. Considers Pb, Zn, Sn, and W. (B13, B14, Pb, Zn, Sn, W)

120-B. Contribution to the Theory of Milling Processes. K. Sedlatschek and L. Bass. *Powder Metallurgy Bulletin,* v. 6, May 1953, p. 148-153.

Mathematical theory of ball milling processes in which empirical elements are eliminated and the limits of applicability can be stated *a priori;* weight-percentages of the fractions are considered as a function of the milling time; and initial particle size distribution is taken into consideration. (B13)

121-B. The Reduction-Oxidation Process for the Treatment of Taconites. F. M. Stephens, Jr., Benny Langston, and A. C. Richardson. *Journal of Metals,* v. 5, June 1953, p. 780-785.

New process for the treatment of oxidized taconites which requires no external heat and has a recovery of Fe units of 92 to 96% in magnetic form. This recovery plus increased grindability of the processed ore indicates that the method will be economically attractive. Tables. (B13, B14, Fe)

122-B. Blasted Bales Give up Secrets. *Steel,* v. 132, June 8, 1953, p. 97-98.

Use of dynamite for checking interior quality of purchased scrap bales. (B22)

123-B. (German.) **White Lead Ore Flotation.** W. Gründer and M. Dulovic. *Zeitschrift für Erzbergbau und Metallhüttenwesen,* v. 6, no. 3, Mar. 1953, p. 99-103.

Continues Petersen's work on flotation of waste sands containing white Pb ore. Adds to Engel's report on flotation possibilities of oxide Pb ores of Nevada's Diamond District. (B14, Pb)

124-B. (German.) **Effect of Coring Phenomena on Metal-Slag Equilibria.** Willy Oelsen, Eberhard Schürmann, and Helmut Maetz. *Zeitschrift für Erzbergbau und Metallhüttenwesen,* v. 6, no. 4, Apr. 1953, p. 128-137.

Test results from Cu and Al-containing Fe melts and Fe-Cu-Al sulfide melts. Tables, graphs. 39 ref. (B21, Fe, Cu, Al)

125-B. (German.) **Comparison of Fluorspar Dressing in Germany With That in North America.** Willy K. Finn. *Zeitschrift für Erzbergbau und Metallhüttenwesen,* v. 6, no. 4, Apr. 1953, p. 137-138.

Feasibility of electrostatic preparation of fluorspar on a commercial scale. Tables. (B21, Ca)

126-B. Iron Ore Supply. A New Appraisal of the Outlook. H. S. Harrison. *Engineering and Mining Journal,* v. 154, June 1953, p. 80-83.

Available reserves, both domestic and foreign. (B10, Fe)

127-B. How New Leach-Float Plant Handles Greater Butte's Ore. John B. Huttl. *Engineering and Mining Journal,* v. 154, June 1953, p. 90-93.

Leach-precipitation-float technique for Cu extraction. Flowsheet. (B14, Cu)

128-B. Kaiser Aluminum Starts Shipping Jamaica Bauxite to U. S. A. *Engineering and Mining Journal,* v. 154, June 1953, p. 96-98.

Description. Photographs. (B10, Al)

129-B. The Chemical Constitution of Sinters. R. Wild. *Iron and Steel Institute, Journal,* v. 174, pt. 2, June 1953, p. 131-135.

Chemical constitutions of a number of commercial sinters and of sinters produced in the B.I.S.R.A. experimental sinter box from both lean and rich ores were found by X-ray powder diffraction photography. Tables. (B16, M22, Fe)

130-B. The Permeability of Sinter Beds. E. W. Voice, S. H. Brooks and P. K. Gledhill. *Iron and Steel Institute, Journal,* v. 174, pt. 2, June 1953, p. 136-139.

Permeability, measurements and typical values. Diagrams. (B16, Fe)

131-B. Flowsheets of the Crushing Plant and Martite Recovery Plant. *Mining World,* v. 15, June 1953, p. 40-42.

Describes operation. Photographs. (B13, Fe)

132-B. World's Richest Antimony Mine. *Mining World,* v. 15, June 1953, p. 47-52.

Extraction and recovery operations at Consolidated Murcheson in South Africa. Photographs, flowsheets. (B12, Sb)

133-B. Zirconium Ores. Oliver C. Ralston. Paper from Zirconium and Zirconium Alloys. p. 1-4. 1953. American Society for Metals, 7301 Euclid Ave., Cleveland 3, Ohio.

Methods of concentration and separation from other dense minerals are listed and discussed. (B14, Zr)

134-B. (German.) **Technical and Economic Questions on the Use and Production of Foundry Coke.** H. Wübbenhorst. *Giesserei,* v. 40, no. 10, May 14, 1953. p. 258-262.

Most suitable type of coke for foundry practice. Type of coal to be used and coking conditions to be observed in the production of a high-grade foundry coke. Graphs, tables, photographs. 10 ref. (B18, E10)

135-B. (Hungarian.) **Theory of the Hydrocyclone and Its Practical Application.** Gustav Tarjan. *Magyar Kémikusok Lapja,* v. 7, no. 9, Sept. 1952, p. 267-276.

Application of the hydrocyclone for enriching Mn slime, coal washing, and purifying pyrite for ceramic production. Tables, charts, photographs. 11 ref. (B13, Mn)

C

NONFERROUS EXTRACTION AND REFINING

89-C. Preparation and Properties of Iodide Vanadium. Julian W. Nash, H. R. Ogden, Richard E. Durtschi, and I. E. Campbell. *Electrochemical Society, Journal,* v. 100, June 1953, p. 272-275.

Describes the process; presents data on some of the physical properties and working characteristics. Tables, graphs, diagrams. 6 ref. (C4, P general, Q general, V)

90-C. Review of Extraction Metallurgy. Graham Oldham. *Mining Journal* (London), Annual Review, May 1953, p. 93-97.

Considers Al, Mg, Cr, V, Ga, Ge, Au, Ni, Cu, Co, Ce, Th, Sn, Ti, U, Zn, and Zr. 30 ref. (C general)

91-C. Production and Uses of Germanium. J. A. Gay. *Chemical & Process Engineering,* v. 34, June 1953, p. 175-179.

A general discussion. British and American processes compared. 10 ref. (C general, T general, Ge)

92-C. Mechanization Program Results in Savings at Laredo Antimony Smelter. R. L. Kulpaca and J. C. Archibald, Jr. *Journal of Metals,* v. 5, June 1953, p. 786-788.

Improvements made in the handling of products and consequent cost reduction. Photographs. (C21, Sb)

93-C. Chihuahua Slag Fuming Plant to Process 19,000 Tons Per Month. V. R. MacDonald. *Journal of Metals,* v. 5, June 1953, p. 789-790.

Plant for recovery of Zn from dump slag containing 10% Zn, at Chihuahua smelter. (C21, B21, Zn)

94-C. Vapor Pressure of Zinc in the Reduction of ZnS by Cu and Fe. A. W. Bethune and L. M. Pidgeon. *Journal of Metals,* v. 5, June 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 804-807.

Equilibrium vapor pressure of Zn was determined by reacting the components in an evacuated tube containing a thin Cu fiber. Equilibrium was established between the brass formed and the Zn in the vapor phase. Composition of the brass formed was determined and equilibrium vapor pressure values obtained from existing data. 12 ref. (C26, P12, Zn, Cu, Fe)

95-C. Vacuum Furnaces for Melting or Processing of Metals. G. Jewett Crites. *Metal Progress,* v. 63, May 1953, p. 161-162, 164-166.

Reasons for new commercial importance of vacuum furnaces. Furnaces are described and classified by the type of heating used. Diagrams. (C25, D8, J general)

96-C. (German.) **Smelting and Casting Costs for Al and Its Alloys in Ingot Foundries.** H. Bohner. *Aluminium,* v. 28, no. 12, Dec. 1952, p. 443-447.

Importance of induction furnace for smelting of light metals. Economic aspects are included. (C21, C5, Al)

97-C. (German.) **Modern Light-Metal Smelting Furnaces.** R. Tripmacher. *Aluminium,* v. 28, no. 12, Dec. 1952, p. 448-449.

Described and illustrated. (C21)

98-C. (German.) **Technetium—Element 43.** J. C. Hackney. *Chemische Tecknik,* v. 5, no. 1, Jan. 1953, p. 17-22.

Preparation and chemical properties. Tables. 55 ref. (C general, P13, Tc)

99-C. (German.) **Observations on Formation of Slag by Passing an Air Current Through the Melt.** Helmut Hartmann, Wilhelm Hofmann, and Wolfgang Stahl. *Zeitschrift für Metallkunde,* v. 44, no. 4, Apr. 1953, p. 123-126.

Method to determine slagging. Factors affecting oxidizability of Pb alloys are emphasized. Graphs, tables. (C21, Pb)

100-C. Non-Ferrous Alloy Ingot Manufacture. W. G. Mochrie. *Foundry Trade Journal,* v. 94, June 4, 1953, p. 637-645; disc., p. 645-646.

Reviews preparation of ingots to specification for the founder. Raw materials, methods of treating, and plant construction. Check methods employed to guarantee uniformity of product and notes on the limitations of the processes. Photographs. (C general, EG-a)

101-C. Continuous-Cast Shapes. *Machine Design,* v. 25, June 1953, p. 129-130.

Process offers economies in design of Cu-alloy parts. Photographs. (C5, Cu)

102-C. A Specialized Method of Smelting Low-Grade Lead Ores. C. C. Downie. *Mining Journal,* v. 240, June 5, 1953, p. 671-672.

Smelting method which utilizes a gas-fired roasting furnace combined with a cylindrical sloping roaster. (C21, Pb)

103-C. The Extractive Metallurgy of Zirconium by the Electrolysis of Fused Salts. Background and Process Evolution. M. A. Steinberg, M. E. Sibert, and E. Wainer. Paper from Zirconium and Zirconium Alloys. p. 37-72. 1953. American Society for Metals, 7301 Euclid Ave., Cleveland 3, Ohio.

Investigation of the production of Zr by the electrolysis of fused salt baths containing halides and double halides of Zr. Current and voltage controlling and recording equipment was designed and constructed so that accurate data could be obtained on the decomposition potentials of the halides utilized. Electrical characteristics of many electrolytes were investigated. Graphs, tables, micrographs. 61 ref. (C23, Zr)

104-C. Some Aspects of the Iodide, or Hot Wire Process for Manufacture of Zirconium. W. M. Raynor. Paper from Zirconium and Zirconium Alloys. p. 73-81. 1953. American Society for Metals, 7301 Euclid Ave., Cleveland 3, Ohio.

Work undertaken to determine rate-limiting factors and optimium operating conditions. Photographs. (C4, Zr)

105-C. The Manufacture of Zirconium Sponge. S. M. Shelton and E. Don Dilling. Paper from Zirconium and Zirconium Alloys. p. 82-120. 1953. American Society for Metals, 7301 Euclid Ave., Cleveland 3, Ohio.

Major steps in the Mg-reduction process which include chemical purification, chlorination, reduction, vac-

uum distillation, sponge handling, and melting. Diagrams, photographs, tables. 23 ref. (C22, C26, Zr)

106-C. Present Production Status of Titanium. R. S. Radcliffe. Symposia on Materials and Design for Lightweight Construction. The Titanium Seminar. Aug. 6, 1951. p. 5-16; P. B. Report No. 111,083, U. S. Dept. of Commerce, OTS, Washington 25, D. C.

Methods of producing Ti. Photographs, diagrams, tables. 16 ref. (C general, Ti)

107-C. (French.) Ideas on the Formation of Melted Salts and the Theory of Igneous Electrolysis. Case of Aluminum. I. Cryoscopy in Melted Cryolite. Maurice Rolin. *Journal du Four Electrique et des Industries Electrochimiques,* v. 61, no. 6, 1952, p. 157-160.

Raoult's law and experimental methods. (To be continued.) (C23, Al)

108-C. (German.) Recent Patents. E. Herrmann. *Aluminum,* v. 29, no. 4, Apr. 1953, p. 166-169.

Brief abstracts of patents on the production of aluminum and silicoaluminum. Diagrams. 27 ref. (C general, Al)

109-C. (German.) Amalgams of Manganese, Iron, Cobalt, Nickel, and Copper. Franz Lihl. *Zeitschrift für Metallkunde,* v. 44, no. 4, Apr. 1953, p. 160-166.

Suspensions in Hg; structures of the Ni-Hg and Mn-Hg phases; and resistance of amalgams to oxidation were studied. Photographs, tables. 13 ref. (C29, Hg, Ni, Mn, Cu, Co)

110-C. (German.) Intermittent Segregation in Pure Aluminum Continuous Casting. Gustav Siebel, Dietrich Altenpohl, and Hans Michael Cohen. *Zeitschrift für Metallkunde,* v. 44, no. 5, May 1953, p. 173-183.

An exudation on the surface of pure Al continuous cast blocks was investigated. Tables, photographs, figures. 11 ref. (C5, Al)

D

FERROUS REDUCTION AND REFINING

215-D. Steel Expands in the Detroit Area. At Rotary Electric Steel Co. Robert Sergeson. **At Great Lakes Steel Corp.** H. L. Klinker. **At Ford Motor Co.** A. Krause. *Iron and Steel Engineer,* v. 30, May 1953, p. 114-118.

Extensive expansion and improvement programs under way in the Detroit area. (D general, AY)

216-D. New Blast Furnace Gas Cleaning Facilities at Donora. S. P. Kinney. *Iron and Steel Engineer,* v. 30, May 1953, p. 139-140, 142.

Describes program which eliminates air and stream pollution from blast furnace operation. (D1)

217-D. From the Ore to the Ingot. James Mitchell. *Iron and Steel Institute, Journal,* v. 174, pt. I, May 1953, p. 1-8.

Existing practices in the industry. (D general, Fe)

218-D. The Water-Cooling of Open-Hearth Furnaces. A. M. Frankau. *Iron and Steel Institute, Journal,* v. 174, pt. I, May 1953, p. 46-52.

Series of measurements were made of flow rate and temperature rise of cooling water supplied to the individual cooling units in a number of openhearth furnaces. Tables. (D2)

219-D. (French.) Effects of Cyanides on the Disintegration of Blast Furnace Shafts. M. Logeling. *Centre de Documentation Sidérurgique, Circulaire d'Informations Techniques,* v. 10, no. 3, 1953, p. 465-490.

A study on the role of intermediate cyanide compounds formed in the hearth on the erosion of the lining. Tables. (D2)

220-D. Utilization of Electricity in Iron and Steel Works. W. F. Cartwright. *Institution of Electrical Engineers, Proceedings,* v. 100, pt. I, May 1953, p. 126-131.

From the point of view of a mechanical engineer and a steelworks operator. Graphs, tables. (D general)

221-D. Lorain Cuts Banked Blast Furnace Blowing-In Time From 72 to 30 Hours. Walter W. Durfee. *Journal of Metals,* v. 5, June 1953, p. 791-793.

Method of converting the tapping hole into a tuyere for reducing blowing-in time. Graphs. (D1)

222-D. Steam Jets Efficiently Remove Dust From Open Hearth Furnace Flues. John Peterson. *Journal of Metals,* v. 5, June 1953, p. 794-795.

Steam jet system for removing flue dust from flues underneath the checkers. Photographs. (D2, A5)

223-D. Pig Iron Smelting in Low-Shaft Furnaces. *Metal Progress,* v. 63, May 1953, p. 210-212, 214.

Condensed by E. C. Wright from "Pig Iron Smelting Without Metallurgical Coke", by W. W. Krebs and D. Jagat Ram, *India Institute of Metals, Transactions,* v. 5, 1951, p. 51-76. Reviews production of pig iron with the Krupp-Renn, Stuerzelberg, Lohse and various low-shaft blast furnaces which were investigated in Sweden, Italy, and Germany during the last 15 years. Process for making pig iron in a somewhat complex furnace arrangement wherein a cheap coal and iron ore mixture is given a presmelting reduction treatment in a rotary kiln similar to that used in the Krupp-Renn process. (D1)

224-D. West Coast Pig Iron Boosted 50% as Kaiser Blows in Third Blast Furnace. *Western Metals,* v. 11, June 1953, p. 48-49.

Increase of pig iron to 1,314,000 tons annually. New furnace consumes only 1400 lb. of coke per net ton of iron produced, compared to a national average of 1600 to 1700 lb. (C1, CI)

225-D. Use of Rare-Earth Metals and Compounds in Stainless Steel Melting. C. B. Post and H. O. Beaver. *Blast Furnace and Steel Plant,* v. 41, June 1953, p. 627-634, 645.

Investigation of the effects of mischmetal in arc-melted austenitic stainless steels. Photographs, tables. (D5, B22, SS)

226-D. Expanded Blast Furnace Slag for Use as Light Weight Concrete Aggregate. R. W. Miller. *Blast Furnace and Steel Plant,* v. 41, June 1953, p. 635-638, 645.

Processes used in manufacturing expanded slag. Various applications. Photographs. 7 ref. (D1, T5)

227-D. The Testing and Development of Basic Refractories for the Open Hearth. L. W. Austin. *Blast Furnace and Steel Plant,* v. 41, June 1953, p. 639-645.

Construction of a laboratory furnace in which various forces can be applied simultaneously. Results of test designed so destructive influences can be controlled. Photographs. (D2)

228-D. Some Aspects of Merchant Iron Furnacing. A. J. Macdonald. *Blast Furnace and Steel Plant,* v. 41, June 1953, p. 646-650, 655.

Plant facilities and operation. Photographs. (D1)

229-D. Removable Open Hearth Slag Pocket Bulkhead Doors. Ray E. Over. *Industrial Heating,* v. 20, June 1953, p. 1120, 1122, 1124, 1126.

Design and use of a removable bulkhead to facilitate removal of slag from openhearth slag pockets. Photographs. (D2)

230-D. Titanium Can Replace Manganese for Sulfur Control of Steel. J. D. Roach and R. S. Stewart. *Iron Age,* v. 171, June 4, 1953, p. 150-153; June 11, 1953, p. 126-128.

Shows that Ti as a desulfurizer is three times more effective in preventing strain aging and grain coarsening in killed steels. 25 ref. (D general, B22, Ti, ST)

231-D. Steelmaking Reactions. Sulphur, Phosphorus and Carbon. P. T. Carter. *Iron & Steel,* v. 26, June 1953, p. 297-302.

Slag constitution, S removal, slag-metal reactions, effects of MgO, FeO, CaF_2, elements dissolved in iron, and temperature. 56 ref. (D general, ST)

232-D. Studies on the Melilite Solid Solutions. R. W. Nurse and H. G. Midgley. *Iron and Steel Institute, Journal,* v. 174, pt. 2, June 1953, p. 121-131.

Melilite is the major constituent of crystalline blast-furnace slag. Synthetic preparations; properties; binary and tertiary systems; and Na and K-bearing melilites. Diagrams, tables. (D1, B21)

233-D. Relining and Enlarging No. 9 Blast-Furnace at Appleby-Frodingham. G. D. Elliot, A. Bridge, E. Jarvis, and T. E. Mitchell. *Iron and Steel Institute, Journal,* v. 174, pt. 2, June 1953, p. 143-158.

Description of the job with details of methods, tools, gears, etc. Diagrams. (D1)

234-D. Production and Quality of A.I.S.I. C-1200 Series Screw Steels. S. Feigenbaum. *Screw Machine Engineering,* v. 14, June 1953, p. 57-58.

Production in openhearth furnaces. (D2, CN)

235-D. (French.) Can the Incorporation of a Chemical Product Charged With Coke Modify the Working of a Blast Furnace and Reduce the Consumption of Coke? M. Legendre. *Circulaire d'Informations Techniques,* v. 10, no. 4, 1953, p. 639-642.

Suggests the introduction of Na_2CO_3 as it would augment basicity of slag, lower its fusion point, and protect coke from CO_2. Tables, graphs. (D1)

236-D. (French.) Heating of Open-Hearth Furnaces With Fuel Oil. J. E. Lafon. *Métallurgie,* v. 85, no. 3, Mar. 1953, p. 205, 207, 209.

Types of fuel oil to use, kind of burner, and design of the furnace. Table, diagram. (To be continued.) (D2)

237-D. (German.) Test Results on Blast Furnaces With Various Hearth Linings and Bottoms. Bernhard Weilandt. *Stahl und Eisen,* v. 73, no. 11, May 21, 1953, p. 696-704.

Behavior and selection of materials; measures and controls in furnace heating; construction of furnace foundation; the salamander; and calculation of temperatures in the hearth. Photographs, graphs, tables, diagrams. 31 ref. (D1)

238-D. (German.) New Working Processes in the Iron Industry and Their Effects on Construction of Metallurgical Plants. G. Bulle. *Zeitschrift des Vereines deutscher Ingenieure (VDI),* v. 95, nos. 14-15, May 15, 1953, p. 435-440.

Improvements in various furnaces to effect best possible working of ores and scrap. Effects and economies in steel production. Diagrams. 2 ref. (D general, A4, ST)

E

FOUNDRY

281-E. Effects of Melting Furnace Atmosphere on Casting Properties and Annealability of Malleable Iron. E. A. Lange and R. W. Heine. American Foundrymen's Society, Preprint 53-4, 1953, 23 p.

Influence of furnace gases on chemistry, mottling, fluidity, hot tearing, annealability, and as-cast microstructure. (E10, J23, M27, CI)

282-E. Induced Flow Process of Baking Oil-Bonded Cores. C. T. Marek and R. J. Wimmert. American Foundrymen's Society, Preprint 53-9, 1953, 11 p.

Study of transformations taking place in conventional core production. Tables, graphs. (E21, N general)

283-E. A General Look at Non-Ferrous Molding Sands. C. A. Robeck and C. A. Sanders. American Foundrymen's Society, Preprint 53-11, 1953, 7 p.

Advantages in using natural sands; presents some formulas. (E18, Cu, Al)

284-E. Agar Gels in Plaster-Bonded Investment. H. Rosenthal and S. Lipson. American Foundrymen's Society, Preprint 53-13, 1953, 3 p.

Shows that addition of agar to mixes was effective when used as a dipping precoat and as a single investment. (E15)

285-E. Feeding Range of Joined Sections. E. T. Myskowski, H. F. Bishop, and W. S. Pellini. American Foundrymen's Society, Preprint 53-14, 1953, 7 p.

Experimental data in which casting soundness was evaluated by radiography of longitudinal strips. Tables, diagrams, graphs. (E23, S13, CI)

286-E. Conveyor Molding Standards. Everett C. Reid. American Foundrymen's Society, Preprint 53-16, 1953, 9 p.

Method of developing time standards for mechanized molding lines. (E19)

287-E. Factors Involved in Making a Sand Mixture. Preliminary Study No. 1. D. F. Baker and D. C. Williams. American Foundrymen's Society, Preprint 53-18, 1953, 6 p.

Preparation of foundry sand mixtures which are evaluated in terms of their mechanical properties. (E18, Q general)

288-E. Solidification of Cylinders. V. Paschkis. American Foundrymen's Society, Preprint 53-19, 1953, 7 p.

Experimental data on long and short cylinders. Graphs, tables. (E25, CI)

289-E. Report of A.F.S. Flowability Committee. J. B. Caine. American Foundrymen's Society, Preprint 53-24, 1953, 3 p.

Latest findings pertaining to testing of core materials. (E18, E21)

290-E. Trends for the Relation of Chill Test Depth and Carbon Equivalent of Gray Cast Irons. E. A. Loria. American Foundrymen's Society, Preprint 53-28, 1953, 4 p.

Tests obtained from two automotive foundries employing different cupola melting practices. Graphs. (E25, CI)

291-E. Developing Standard Data Tables for Core Finishing. L. L. Martin. American Foundrymen's Society, Preprint 53-29, 1953, 12 p.

Development of data tables for medium and heavy cores ranging from 15 to 1500 lb. in weight. (E21)

292-E. Resins and Sands for Shell Molding. Manuel F. Drumm. American Foundrymen's Society, Preprint 53-30, 1953, 11 p.

Various properties of resins and sands. (E18, E19)

293-E. Deformation of Green Molding Sand. W. G. Parker. American Foundrymen's Society, Preprint 53-32, 1953, 6 p.

Test data in tabulated form. (E18)

294-E. Velocities and Volume Rates of Metal Flow in Gating Systems. W. H. Johnson, H. F. Bishop, and W. S. Pellini. American Foundrymen's Society, Preprint 53-33, 1953, 11 p.

Quantitative studies of effects of various gating systems on flow characteristics during first stage pouring. (E22, E23)

295-E. Casting Magnesium Alloys in Shell Molds. Nicholas Sheptak. American Foundrymen's Society, Preprint 53-36, 1953, 7 p.

Successful production of Mg shell-mold castings when inhibitors were used as addition agents or mold washes. (E16, Mg)

296-E. Veining Tendencies of Cores. A Progress Report by A.F.S. Sand Division Committee 8-J. American Foundrymen's Society, Preprint 53-37, 1953, 5 p.

Relationship between hot strength, hot deformation, and veining tendencies of cores. Tables. (E21, E18, CI)

297-E. Ramming of Molding Sands. Harry W. Dietert and Alex L. Graham. American Foundrymen's Society, Preprint 53-39, 1953, 11 p.

Test on the effect of squeeze ramming properties on the physical properties of four production molding sands. Tables, graphs. (E18)

298-E. Solidification at Corner and Core Positions. F. A. Brandt, H. F. Bishop, and W. S. Pellini. American Foundrymen's Society, Preprint 53-41, 1953, 7 p.

Effects of core and wall thicknesses on solidification rates of cast steel. (E25, CI)

299-E. Use of Standards in Controlling Costs. Wm. Busby. American Foundrymen's Society, Preprint 53-44, 1953, 9 p.

Cost reduction potential made possible by use of standards in the foundry industry. Tables. (E general, S22, A4)

300-E. Correlation of Air Furnace Bottom Temperature to Refractory and Operating Practice in a Cupola-Air Furnace Duplex System. F. W. Jacobs and J. S. Lawrence, Jr. American Foundrymen's Society, Preprint 53-45, 1953, 10 p.

Experimental data; method of furnace construction. Schematic diagram, graphs, tables. (E10)

301-E. Some Factors Affecting Spherical-Type Macro-Gas Porosity in 85-5-5-5 Bronze. R. B. Fischer. American Foundrymen's Society, Preprint 53-46, 1953, 20 p.

Experimental procedure in which observations were made on a specially designed casting. Effects of mold materials, binders, coatings, melting methods, degassification, and deoxidation were studied. Results were photographed. (E25, Cu)

302-E. Magnesium Alloy Permanent Mold and Semi-Permanent Mold Castings. M. E. Gantz, Jr., E. M. Gingerich, and R. T. Woods. American Foundrymen's Society, Preprint 53-49, 1953, 8 p.

Current status of the art of casting Mg. (E12, Mg)

303-E. Evaluation of Mold Materials for Titanium Castings. R. M. Lang, J. G. Kura, and J. H. Jackson. American Foundrymen's Society, Preprint 53-52, 1953. 5 p.

Mold development program for making high-purity Ti castings; describes gas-atmosphere induction furnace. (E18, Ti)

304-E. Progress Made in Fluidity Testing of Molten Metals During the Last Ten Years. A. I. Krynitsky. American Foundrymen's Society, Preprint 53-71, 1953, 12 p.

Commonly used methods. Schematic diagrams. (E25, Al)

305-E. Laying Out a Mechanized Shell Molding Foundry. Ray Olson. *Foundry,* v. 81, June 1953, p. 108-112.

Describes layout and equipment installed. Photographs. (E16)

306-E. Rapid Advances Made in Casting Light-Metal Alloys. John Howe Hall. *Foundry,* v. 81, June 1953, p. 114-117, 281-283.

Casting techniques for Al alloys 355, 356, 220, 142, 132, 195, 108, WAD 6344 (new), and Mg alloys AZ-91, AZ-92, AZ-63, ZRE-1, ZT-1, and Z5Z. Photographs. (E general, Al, Mg)

307-E. New Coreroom Handles Jobbing Work Efficiently. John E. Wolf. *Foundry,* v. 81, June 1953, p. 118-119, 221.

Simple and efficient coreroom which reduces costs, increases production, and improves quality of cores. Photographs. (E21)

308-E. Internal Porosity and Inverse Segregation in White Cast Iron. W. B. Sobers. *Foundry,* v. 81, June 1953, p. 128-131, 284-288.

Behavior of solidifying metals which results in internal shrinkage. Discusses forces which are active during solidification and which should be balanced in the attempt to produce sound castings. Micrographs, graphs. (E25, CI)

309-E. New Brake Shoe Foundry Operating in California. *Foundry,* v. 81, June 1953, p. 132-133.

New factory and its equipment. Photographs. (E11)

310-E. How to Eliminate Some Machining on Castings. H. L. Smith. *Foundry,* v. 81, June 1953, p. 215, 217, 220.

Several methods of eliminating certain drilling and tapping operations, together with a method for casting difficult lugs or projections without machining. (E general, G17, CI)

311-E. Economical Use of Metals in the Foundry. D. W. Hammond. *Foundry Trade Journal,* v. 94, Apr. 16, 1953, p. 433-438; Apr. 23, 1953, p. 475-478; disc., p. 479.

Methods for better utilization of raw materials in the foundry, and conversion of swarf and borings into useful metal. Diagrams, photographs, tables. (E general, A8, CI, ST)

312-E. Castings for the Smithy and Forge. W. S. Spenceley. *Foundry Trade Journal,* v. 94, Apr. 23, 1953, p. 467-473; Apr. 30, 1953, p. 503-506.

Castings for power hammers and friction drop-hammers, and their mode of functioning. Chilling or heat absorption methods are contrasted with pressure feeding. Mold-assembly methods. Control methods. Photographs. (E11, T5, CI)

313-E. Quality in Light-Metal Castings. *Foundry Trade Journal,* v. 94, Apr. 23, 1953, p. 474, 480.

Shows that the light metal industry is likely to be retarded if short-sighted methods of development are adopted. Standards of quality and service. (E general, S22, Al)

314-E. New Foundry for Heavy Non-Ferrous Castings. A. R. Parkes. *Foundry Trade Journal,* v. 94, Apr. 30, 1953, p. 489-494.

Foundry layout and design. Photographs. (E general)

315-E. Design, Installation and Operation of a Water-Cooled Cupola. J. W. Dews. *Foundry Trade Journal,* v. 94. May 7, 1953, p. 519-522; May 14, 1953, p. 561-564; disc., p. 564-565.

Situation existing at the foundry before water-cooling of cupolas was in use; reasons for its adoption. Operating details and economics of applying water-cooling segments to cupolas running for 8-hr. melts. Empirical equations for the heat balance are included. Diagrams. (E10)

316-E. Steel Castings and Their Application. Frank Rowe. *Foundry Trade Journal,* v. 94, May 7, 1953, p. 525-527.

Factors which make steel a difficult material to cast. Various improvements and recent progress are included. Tables. (E general, CI)

317-E. Tunnel-Type Continuous Core Stove. *Foundry Trade Journal,* v. 94, May 14, 1953, p. 559-560.

Design and operation of a gas-fired, tunnel-type, continuous unit. (E21)

318-E. Reverberatory Furnace for the Small Foundry. *Machinery Lloyd* (Overseas Ed.), v. 25, May 9, 1953, p. 111-112.

Advantages, firing, charging, output, and melting data. (E10, C21)

319-E. What the Purchasing Agent Should Know About Buying Die Castings. F. G. Krach. *Precision Metal Molding,* v. 10, Sept. 1952, p. 32-34, 80-81.

Factors to be considered. (E13)

320-E. Investment Cast Gears and Cams in Custom-Built Machines. *Precision Metal Molding,* v. 10, Sept. 1952, p. 36-38.

Features of the process. Considers cycling of operations. Photographs. (E15, Cu, CI)

321-E. Weak, Assembled Components Replaced by One-Piece Die Castings. G. L. Oman. *Precision Metal Molding,* v. 10, Nov. 1952, p. 23, 54.

Castings for coupling pistons. Photographs. (E13)

322-E. How Frozen Mercury Patterns Are Used to Produce Investment Castings. *Precision Metal Molding,* v. 10, Nov. 1952, p. 24-26.

Photographs illustrate process. (E15)

323-E. Die Castings and Sinterings. A Useful Combination for Appliances. O. E. Lackner. *Precision Metal Molding,* v. 10, Nov. 1952, p. 28-29.

Points out accuracy which is obtainable. (E13, H15)

324-E. Permanent Mold Castings in Zinc Where Quantities Are Limited. L. Peters. *Precision Metal Molding,* v. 10, Nov. 1952, p. 32, 58-59.

Castings for manufacture of automobile horns. (E12, Zn)

325-E. Rubber and Leather Can Be Bonded to Die Castings for Oil Seals. *Precision Metal Molding,* v. 11, Jan. 1953, p. 25, 77-78.

Technique. (E13, K11, Zn)

326-E. Machined? Brazed? Forged? or Investment Cast? *Precision Metal Molding,* v. 11, Jan. 1953, p. 36-37.

Problems associated with production of an irregular-shaped flyball. Solution is investment casting in AISI E52100 steel. (E15, AY)

327-E. Pressure-Tight Die Castings Used in Moisture Injector. Lavern Berg. *Precision Metal Molding,* v. 11, Jan. 1953, p. 38, 62-63.

Construction of a vacuum tight, "Hydro-Power Injector". (E13)

328-E. Here's How the "Unit Strip" System Aids the Designer and Buyer of Plaster Mold Castings. *Precision Metal Molding,* v. 11, Jan. 1953, p. 40-41.

How it is possible to make several thousand parts from a single pattern at only a slight difference in unit cost. (E16, E17)

329-E. What Future for Plated Aluminum Die Castings? *Precision Metal Molding,* v. 11, Jan. 1953, p. 43-44.

Applications of Cr-plated Al castings. (E13, L17, Al, Cr)

330-E. High Cost of Machine Tools Avoided by Investment Castings. *Precision Metal Molding,* v. 11, Feb. 1953, p. 31.

Description. (E15)

331-E. Permanent Mold Castings in Hand-Held, Book Molds for Low-Temperature Alloys. *Precision Metal Molding,* v. 11, Feb. 1953, p. 35, 84-85.

Describes techniques using a variable alloy composition (trade secret). (E12, SG-d)

332-E. How to Get the Most From the Die Casting Process. Martin B. Brandt. *Precision Metal Molding,* v. 11, Feb. 1953, p. 40, 80-83.

Describes a redesign which utilized Al castings in production of master lighting switch for automotive use. (E13, T21, Al)

333-E. Substitution of Plaster Molds for Sand Gives Accurate, Low-Cost Castings. *Precision Metal Molding,* v. 11, Feb. 1953, p. 46-47.

Use of gypsum casting plaster for nonferrous alloys. (E16, EG-a)

334-E. Methods of Lubricating Moving Parts of Die Casting Dies. W. M. Halliday. *Precision Metal Molding,* v. 11, Feb. 1953, p. 86-98.

Main lubricating problems and possible solutions. Diagrams. (E13, A5)

335-E. Die Castings vs. Stampings for Large, Thin Pieces. *Precision Metal Molding,* v. 11, Mar. 1953, p. 31-32.

Die-casting steel and Al parts. Photographs. (E13, Al, ST)

336-E. Die Casting. Answer for Short Run of a Special Shape. *Precision Metal Molding,* v. 11, Mar. 1953, p. 38-39, 58-59.

Advantages of die casting cams. Photographs. (E13, CI)

337-E. Die Cast Zinc for Stability and Strength. Charles B. Lee. *Precision Metal Molding,* v. 11, Mar. 1953, p. 46, 78.

Use of Zn die-cast end bells for small electric mixers. (E13, T10, Zn)

338-E. Two-Piece Patterns Used for Heat-Resistant Investment Castings. D. C. Scheele. *Precision Metal Molding,* v. 11, Mar. 1953, p. 49-50.

Production of infra-red radiant gas burners from 35-15 Ni-Cr alloy. Principle of burner operation, construction, and investment vs. sand casting. Photographs. (E15, E11, Ni)

339-E. Pattern Dies for Investment Casting. S. Lipson and H. Rosenthal. *Precision Metal Molding,* v. 11, Mar. 1953, p. 82-97; Apr. 1953, p. 115-116, 121-122, 125-126.

Pattern die types, factors affecting die design, fundamental considerations, shrinkage allowance, casting, pressing, centrifuging, and machined dies. Diagrams. (E15, E17)

340-E. Small Iron Sand Castings Can Be Converted to the Precision Metal Molding Processes. *Precision Metal Molding,* v. 11, Apr. 1953, p. 29-33.

Results of survey to determine how many duplicate parts are used per year, who buys them, and how much machining adds to the piece cost. Photographs, tables. (E11, E13, E15, CI)

341-E. The Antioch Process for Extra-Large Aluminum Castings With Close Dimensional Control. *Precision Metal Molding,* v. 11, Apr. 1953, p. 44-45, 132-134.

Casting size, surface finish, dimensional accuracy, metallurgical quality, and intricacy of castings. Photographs. (E16, Al)

342-E. Die Cast Housings Have Many Advantages. E. Erdman. *Precision Metal Molding,* v. 11, Apr. 1953, p. 46-47.

(E13, Zn, Al)

343-E. The Place of Shell Molding as a Precision Casting Method. R. A. Kempe. *Precision Metal Molding,* v. 11, May 1953, p. 30-31, 71-73.

Advantages of the process. Photographs. (E16)

344-E. Aluminum Die Casting Replaces Laminated Plastic-Bonded Paper. *Precision Metal Molding,* v. 11, May 1953, p. 40, 73.

An Al mold for replacing rubber insulation on a spliced wire. (E13, T1, Al)

345-E. Limitations of Investment Cast Tool Alloys. Davidlee Von Ludwig. *Tool Engineer,* v. 30, June 1953, p. 51-55.

How segregation, grain size and mechanical properties affect success. Experiments using SAE Type 52100 steel. Micrographs. (E15, Q general, M27, SS)

346-E. (French.) Influence of Foundry Blacks on Castings. The Noirfran Brand. Pierre Nicolas. *Fonderie,* no. 86, Mar. 1953, p. 3351-3356.

Use of ground bituminous coal in foundry sands to promote smoother surfaces. Diagrams, tables. (E18, CI)

347-E. (German.) Casting of Individually Cast Piston Rings. C. Englisch. *Berg- und Hüttenmännische Monatshefte,* v. 98, no. 1, Jan. 1953, p. 8-12.

Compares procedures for producing piston rings from individual castings and from centrifugally cast cylinders. Photographs, graphs. (E14, CI)

348-E. (German.) Physico-Chemico Basis of Cast Steel Foundry Practice. W. Trommer. *Giesserei,* v. 40, no. 3, Feb. 5, 1953, p. 69-75.

Fundamentals which govern the flow of molten steel. Graphs, diagrams, tables. (E23, CI)

349-E. Shell Molding's Outstanding Opportunities for Foundry Advancement. James H. Smith. *Automotive Industries,* v. 108, June 1, 1953, p. 68-69, 112.

Molding technique which produces a very smooth and accurate casting and utilizes pressures up to 500 psi. Cost and possible mechanization of the molding operation. Photographs. (E16)

350-E. Conveying Foundry Sands Pneumatically. C. J. Converse. *Canadian Metals,* v. 16, May 20, 1953, p. 30, 32.

Method of transporting conditioned foundry sands pneumatically through steel pipes to molders and coremakers. Performances of actual installations are quoted and the sand system in a typical foundry installation is described. (E18)

351-E. Wet Method for Sand Reclamation. C. E. Maddick. *Canadian Metals,* v. 16, May 20, 1953, p. 34, 37-38.

Operation of a wet type sand reclaimer installed in a large mechanized foundry. Installation has successfully answered major problems of maintaining quality with economy. Performance of the reclaimed sand. (E11, A8)

352-E. Fluidity Test for Quality Control in the Foundry. T. P. Yao. *Foundry Trade Journal,* v. 94, May 21, 1953, p. 573-577.

A miniature special test which provides a simple means of determining fluidity of liquid metal. Graphs, diagrams. (E25)

353-E. Proving Tests and Procedures for New Dies. W. M. Halliday. *Foundry Trade Journal,* v. 94, May 21, 1953, p. 579-581.

Precision, shape, strength, and finish of die casting dies. (E13, T5)

354-E. A Malleable Cast Ferrous Alloy With Good Hardening and Welding Properties. *Machinery* (London), v. 82, June 12, 1953, p. 1106-1108.

Technique for casting a new fer-

rous alloy. Composition and properties. Graphs.
(E11, Q general, P general, CI)

355-E. (German.) **Alloying and Foundry Practice as Related to Bronze.** E. Thews. *Giesserei*, v. 40, no. 7, Apr. 2, 1953, p. 168-170.
Foundry properties of Pb-containing bronze. Emphasizes variation by alloying and thermal factors; NiS and Fe contents; gas content; smelting and casting temperatures; additions of scrap and residues; and use of P as deoxidizing or alloying component. Tables. 17 ref.
(E general, Cu)

356-E. (German.) **Compressed-Air Piping and Requirements of a Converted Foundry.** R. Brinkmann, W. Woifer, and W. Gesell. *Giesserei*, v. 40, no. 7, Apr. 2, 1953, p. 171-174.
Examines air requirements for mechanization from standpoint of the molding machines, exhaust vents, sandblasting equipment, and stampers. Influences of conductance distance and cross section are computed for leakage and pressure. Graphs. 14 ref. (E19)

357-E. (German.) **Precautions in Cupola Furnace Dumping.** *Giesserei*, v. 40, no. 7, Apr. 2, 1953, p. 179-180.
Functioning of the pneumatic hopper. Diagrams. (E10)

358-E. (German.) **West German Cast-Metal Production in 1952.** Günther Hücking. *Metall*, v. 7, nos. 7-8, Apr. 1953, p. 292.
General discussion. Tables.
(E general, A4)

359-E. Runners and Risers for Steel Castings. E. Daybell. *Foundry Trade Journal*, v. 94, May 28, 1953, p. 601-609.
Typical methods. Various set-ups. Photographs and diagrams.
(E22, CI)

360-E. Predicting Casting Costs. Philip Tripoli. *Machine Design*, v. 25, June 1953, p. 139-154.
Scientific approach, based on statistical analysis of actual parts, for accurate determination of casting costs at early design stages. Photographs, graphs, diagrams.
(E general, A4)

361-E. Anchorage and Location of Inserts in Die Castings. T. P. Barbicane. *Machinery* (London), v. 82, May 29, 1953, p. 1015-1018.
Different types of steel inserts which may be used. Diagrams.
(E13, ST)

362-E. Beryllium-Copper Die Cavity Inserts. L. C. Barton. *Machinery* (London), v. 82, May 29, 1953, p. 1018-1021.
Advantages of using Be-Cu inserts. Compares performance with those of die or hobbing-steels.
(E13, Be, Cu, TS)

363-E. New A.P.V. Foundry Layout Planned for Flexibility of Production. *Metal Industry*, v. 82, May 29, 1953, p. 437-438.
Layout of a foundry capable of producing stainless steel, Al, and Cu-base alloy castings. Photographs.
(E general, Al, Cu, SS)

364-E. Pressure Die-Casting Review. Die-Castings in Begwaco Gas Meters. *Metal Industry*, v. 82, May 29, 1953, p. 443-446.
Describes and illustrates parts which are pressure die-cast.
(E13, CI)

365-E. Alloys and Melting Practice. *Modern Metals*, v. 9, June 1953, p. 40-41, 44, 46, 48-49.
Zn and Al die casting alloys with respect to melting practice, dross recovery, contamination, permanent mold melting, automatic ladling, and fuel consumption. Diagrams.
(E13, E12, Zn, Al)

366-E. Casting and Forging of Titanium and Its Alloys. F. H. Vandenburgh. Symposia on Materials and Design for Lightweight Construction. The Titanium Seminar. Aug. 6, 1951. p. 77-82; P.B. Report No. 111,083, U. S. Dept. of Commerce, OTS, Washington 25, D. C.
Mechanical properties of Ti and Ti alloys in the as cast and forged states.
(E general, F general, Q general, Ti)

367-E. (Dutch.) **Nodular Cast Iron.** *Metalen*, v. 8, no. 7, Apr. 15, 1953, p. 165-171.
College report presented by Prof. A. de Sy at the Polytechnic Institute, Delft, Mar. 9 and 10, 1953. Various viewpoints on formation of nodular graphite. Graphs, diagrams. 9 ref. (E25, CI)

368-E. (French.) **Graphs in the Foundry, Guides for Technical Management.** J. Pascal. *Métallurgie*, v. 85, no. 3, Mar. 1953, p. 161-168, 171, 173.
Value of graphs showing tonnages charged for each successive smelting; tonnages of waste produced; yields; production results; and movement of supplies. Graphs. (To be continued.) (E general)

369-E. (French.) **Defects of Pressure Castings.** R. Grunberg. *Métallurgie*, v. 85, no. 3, Mar. 1953, p. 175, 177, 179.
Irregularities influencing precision and mechanical characteristics of cast pieces. (To be continued.)
(E13)

370-E. (German.) **Present Status of the Spray Process in Repairing Scaling in Cupola Furnaces.** Kurt Krämer. *Giesserei*, v. 40, no. 7, Apr. 2, 1953, p. 165-167.
Advantages of gun application of refractory repairs. Graphs. 3 ref.
(E10)

371-E. (German.) **Desulfurizing Iron in Foundry Practice.** K. Roesch. *Giesserei*, v. 40, no. 9, Apr. 30, 1953, p. 230-234.
Desulfurization of iron by means of lime and coal dust in reducing atmosphere after thorough mixing. Graphs, diagrams. (E10, CI)

372-E. (German.) **The Enslin Device, Its Operation and Resultant Errors.** O. Eckart. *Giesserei*, v. 40, no. 9,
Device for determining sand binding properties of bentonite. Sources of error and their elimination. Graphs. (E18)

373-E. (German.) **Properties and Use of Customary Foundry Molding Sands.** H. Benner. *Giesserei*, v. 40, no. 10, May 14, 1953, p. 266-268.
Synthetic sand is recommended since it can be used for very satisfactory molds made by unskilled workers. Complex castings should be made of special sands. Production and merits of cores made of green and dry sand and by the Croning process. Diagrams, tabulated data. (E18)

374-E. (German.) **Eliminating Difficulties in Production of Fuse Caps During Aluminum Chill Casting.** *Giesserei*, v. 40, no. 11, May 28, 1953, p. 294-296.
Ways of producing caps and possibilities of meeting a variety of requirements by choice of correct mold construction. Diagrams.
(E11, Al)

F

PRIMARY MECHANICAL WORKING

146-F. Modern High Speed Side Trimming Lines. J. Raymond Erbe. *Blast Furnace and Steel Plant*, v. 41, May 1953, p. 514-519.
Developments for trimming strip metal which have resulted in motor regulation of winding reel and fast stopping. Photographs, graphs.
(F29)

147-F. Pass Design for Hexagons. H. E. Muller. *Iron and Steel Engineer*, v. 30, May 1953, p. 55-63; disc., p. 63-64.
Shows that present high delivery speeds and production rates of the modern bar mill require both refinements in design and flexibility for size changes. Diagrams, graphs.
(F23)

148-F. Processing, Properties, and Application of Cold Finished Carbon Steel Bars. J. F. Byers. *Iron and Steel Engineer*, v. 30, May 1953, p. 103-107; disc., p. 107.
Processing of, and properties and applications involved in production of cold drawn and turned carbon steel bar stock. Tables, Photographs. (F27, CN)

149-F. Mechanized Hot Scarfing. J. H. Zimmerman. *Iron and Steel Engineer*, v. 30, May 1953, p. 108-112; disc., p. 112-113.
Types and basic features of scarfing machines; installation recommendations; improvements in process; and future developments. Photographs. (F21, CN, AY)

150-F. New Mill Rolls Uranium Bars on Production Basis. *Iron Age*, v. 171, May 28, 1953, p. 138.
Operation of the rolling mill.
(F23, U)

151-F. Forged Fittings Made of Magnesium. An Important New Development. *Magnesium*, May 1953, p. 10-11.
Forged plumbing fittings from AZ 80 alloy slugs. Photographs.
(F22, Mg)

152-F. Reducing Weight With Magnesium Plate. *Magnesium*, May 1953, p. 12-16.
Rolling the plate, mechanical properties, and applications.
(F23, Q general, T general, Mg)

153-F. Electrically-Driven 42½-In. Cogging Mill. *Engineering*, v. 175, May 15, 1953, p. 633-635.
Electric power supply; excitation equipment; control system and circuits; operating conditions. (F23)

154-F. The Hot-Forging of Metals. H. K. Barton. *Machinery* (London), v. 82, June 12, 1953, p. 1109-1113.
Problems and solutions of impact forging. Diagrams. (F22)

155-F. Treatment of Edges of Fabricated Sheet Steel. Fred Rogers. *Modern Machine Shop*, v. 26, June 1953, p. 150-154, 156, 158.
Methods for finishing off rough edges of various thicknesses of sheet metal. Diagrams. (F29, CN)

156-F. Consett Development. New Blooming, Slabbing and Billet Mills. *Iron & Steel*, v. 26, May 1953, p. 162-168; June 1953, p. 309-314.
General layout, problems of civil engineering, and the new mills. Photographs, diagrams. (F23)

157-F. Wire Drawing Dies. B.I.S.R.A. Profiloscope for Checking Taper and Wear. *Iron & Steel*, v. 26, June 1953, p. 308-320.
Description. (F28, Q9)

158-F. Press-Extruded Forgings. L. M. Christensen. *Machine Design*, v. 25, July 1953, p. 124-127.
New process for producing Al precision forgings without draft. Photographs, diagrams. (F22, Al)

159-F. Forging of Titanium Requires Special Techniques. Gordon S. Tracy. *Machinery* (American), v. 59, June 1953, p. 202-205.
How forging Ti differs from Al or steel. Photographs.
(F22, Ti, Al, ST)

160-F. Strip Mill With Designed-In Extras. *Steel*, v. 132, June 15, 1953, p. 102, 104, 107-108.
New 80-in. hot strip line. Flowsheet. (F23, ST)

161-F. Billet Heating Furnace Replaced in 16 Days. *Steel,* v. 132, sec. 1, June 22, 1953, p. 98, 100.

How new 2-zone reheating furnace was moved 44 ft. to permanent location in skelp mill train. (F21, ST)

162-F. Willys-Overland Shop Forges Million Pounds Monthly. *Steel Processing,* v. 39, June 1953, p. 273-274.

Plant and equipment. Photographs. (F22)

163-F. Fabrication of Zirconium. R. B. Gordon and W. J. Hurford. Paper from Zirconium and Zirconium Alloys. p. 131-145. 1953. American Society for Metals, 7301 Euclid Ave., Cleveland 3, Ohio.

Consolidation of iodide Zr by nonfusion methods such as extrusion or hot compacting of crystal bar and pressing and sintering of Zr hydride. Present practices for hot working Zr ingots to primary shapes by forging, rolling, and extrusion. Information is given for cold rolling, drawing, swaging, forming, and machining. Tables. 28 ref. (F general, G general, Zr)

164-F. (French.) Soaking Pit Hearths. M. Paschal. *Circulaire d'Informations Techniques,* v. 10, no. 4, 1953, p. 647-653.

Cleaning hot and cold pits. Table. (F21)

165-F. (French.) Modern Pit Furnaces at the Rombas Factory of the Sidelor Company. M. Lesage. *Circulaire d'Informations Techniques,* v. 10, no. 4, 1953, p. 654-665.

Construction of soaking pits designed to burn a mixture of blast furnace and coke oven gas. Combustion products from each unit were analyzed. Tables, diagrams, graphs. (F21)

166-F. (German.) Influence of Cuprous Oxide Content on Drawing Properties of Heated, Zinc-Electroplated Copper Wires. F. Lihl. *Metall,* v. 7, nos. 9-10, May 1953, p. 324.

Preparation of brass-coated Cu wires. Photographs. (F28, Cu)

167-F. (German.) Importance of Fuel Economy for Hot-Working Plants of Special Steel Works. W. Riemann. *Stahl und Eisen,* v. 73, no. 11, May 21, 1953, p. 721-727.

Functions of fuels department in plant. Classification of steels produced, optimum heating periods of various grades of product, temperature distribution at surface and in core, and temperature losses during withdrawal from the furnace. Photographs, graphs. 2 ref. (F21, ST)

168-F. (Book.) The Wire Industry Encyclopaedic Handbook, 1953. 448 p. 1953. The Wire Industry, Ltd., 33 Furnival St., London, E.C.4, England.

Provides useful technical information on wiredrawing, care of wire ropes, etc., and defines a large number of metallurgical terms and processes met within the industry. Includes buyers' guide to British firms. (F28)

G

SECONDARY MECHANICAL WORKING

202-G. Producing Pressed Metal Bathtubs. Sweden. Gösta E. Sandstrom. *Finish,* v. 10, June 1953, p. 49-53.

Layout and equipment. Photographs. (G1, L27, CN)

203-G. Grinding Plus Mechanization Equals 2 Times Cleaning Output. W. M. Fitzsimmons. *Iron Age,* v. 171, May 28, 1953, p. 132-134.

How casting cleaning department, modernized with grinding equipment and mechanized conveyors, has doubled output with half as many men. More thorough cleaning has sharply reduced rejects. (G18, CI)

204-G. Cast Meehanite Rolls Used for Heavy-Duty Bending. M. R. Nelson. *Iron Age,* v. 171, May 28, 1953, p. 135-137.

By designing and casting large plate bending rolls of Meehanite metal, a plant's capacity for rolling boiler plate was increased from 1 in. to 2½ in. (G6, T5, CI)

205-G. Machining. Theory and Practice. K. G. Lewis and W. Milne. *Machinery* (London), v. 82, May 15, 1953, p. 918-924.

Grinding sensitivity and burn; and machining steels, cast irons, and various nonferrous alloys. Micrographs. (G17, G18, ST, CI, EG-a)

206-G. Soviet Machine Tools. Special Purpose Equipment and Machines. J. Mannin. *Engineers' Digest,* v. 14, May 1953, p. 174-178, 186.

Measuring and machining. Describes a bevel spiral gear generator and a gear grinder. Diagrams. (G17, G18)

207-G. The Carbide Milling of Cast Steel Components. Herman Reichardt. *Machine and Tool Blue Book,* v. 49, June 1953, p. 155-159.

Basic methods of estimating power consumption and cutter requirements. Information can be used on all milling operations where carbides are used. (G17, CI)

208-G. High Speed Steel Drilling Speeds and Feeds for Various Materials. *Machine and Tool Blue Book,* v. 49, June 1953, p. 207.

Tabulated information on drilling speeds for Al, Cu, and various steels. (G17, Al, Cu, CN, CI, AY)

209-G. Suggested Surface Speeds for Various Work Materials. *Machine and Tool Blue Book,* v. 49, June 1953, p. 209.

Tabulated information on surface speeds for Al, Cu, plastics, and various steels. (G17, Al, Cu, AY, SS, CI, TS)

210-G. Suggested Table Feeds (in Inches Per Tooth) for Various Work Materials When Machined With Multiple Point Tools. *Machine and Tool Blue Book,* v. 49, June 1953, p. 211.

Tabulated information on table feeds for Al, Cu, plastics, and various steels. (G17, Al, Cu, CI, AY, SS, TS)

211-G. Hydraulic Forming Techniques Applied to the Manufacture of Musical Instruments. *Machinery* (London), v. 82, June 12, 1953, p. 1089-1099.

Modifications of hydraulic forming techniques, hydraulic forming of tubes, and hydraulic forming presses. Photographs. (G1, Cu)

212-G. Producing Gas Turbine Parts With Minimum Metal Wastage. Cyril J. Bath. *Machinery* (London), v. 82, June 12, 1953, p. 1101-1104.

Uses of radial draw forming. Illustrations. (G9)

213-G. Processing of Boron Steels in the Shop. G. D. Rahrer. *Metal Progress,* v. 63, May 1953, p. 85-89.

Machining; punching; cold forming, such as cold heading and hobbing; hot forming; and welding. Tables. (G general, K general, AY)

214-G. Electrolytically-Assisted Diamond Wheel Grinding of Carbides is "Promising". *Metal Progress,* v. 63, May 1953, p. 198, 200, 202.

Condensed by A. H. Allen from "Electrolytically-Assisted Diamond Wheel Grinding of Cemented Carbide", by N. W. Thibault and B. H. Anderson, Technical Bulletin 526, Norton Co., Worcester, Mass., Nov. 1952. Experimental testing on grinding of carbide tools. (G18, C-n)

215-G. Solving Stainless Steel Fabricating Problems. Lester F. Spencer. *Modern Machine Shop,* v. 25, May 1953, p. 126-134; v. 26, June 1953, p. 164-168, 170-171, 174, 176, 178, 180, 182, 184.

Problems in use of austenitic grades of stainless steels, including bending and drawing operations. Diagrams. (G4, G6, SS)

216-G. Die Maintenance. A. Peterson. *Modern Machine Shop,* v. 26, June 1953, p. 188-190, 192.

Die alignment and the use of standard die sets. (G general)

217-G. (German.) High Capacity Tools for Working of Light Metal Sheet. G. Oehler. *Aluminium,* v. 28, no. 12, Dec. 1952, p. 428-435.

Construction and operation of tools for deep drawing. Stretching and rubber pad drawnig processes. (G4, G8, G9, Al)

218-G. (German.) Machining Rules for Various Materials and Tools. W. Späth. *Metall,* v. 7, nos. 7-8, Apr. 1953, p. 241-247.

Problems and answers regarding dependence of tool application on cutting speed. Graphs, tables. 6 ref. (G17)

219-G. (German.) Computing of Temperature Distribution in Case of Oxy-Acetylene Cutting. Peter Grassmann. *Zeitschrift für angewandte Physik,* v. 4, no. 12, Dec. 1952, p. 455-458.

Temperature range was computed for a linear heat source moving in a straight line with a constant speed through a heat-conducting plate. (G21)

220-G. Stampings. Cheapening Production by Improving Design. Federico Strasser. *Iron & Steel,* v. 26, May 1953, p. 183-187; June 1953, p. 303-307.

Examples of practical and economical results obtained from the collaboration between article designer and tool engineer. Diagrams. (G3)

221-G. Cutting Characteristics of Titanium and Its Alloys. L. V. Colwell and W. C. Truckenmiller. *Mechanical Engineering,* v. 75, June 1953, p. 461-466, 480.

Investigation to evaluate unique and pertinent cutting characteristics of Ti and its alloys to designate necessary changes in commercial practice in regard to tools, size of cut, speed, etc. Tables, micrographs. 7 ref. (G17, Ti)

222-G. Speeds and Feeds for Cutting Off Steel. *Screw Machine Engineering,* v. 14, June 1953, p. 53-54.

Tabulated data sheet. (G17, ST)

223-G. The Cold Extrusion of Steel. H. Fischer. *Sheet Metal Industries,* v. 30, June 1953, p. 447-457; disc., p. 457-463.

Theoretical aspects of deformation in steel. Requirements for presses and construction of tools for various applications. Diagrams, photographs, graphs. (G5, ST)

224-G. The Cold Extrusion of Steel and the Use of Hydraulic Presses. E. V. Crane. *Sheet Metal Industries,* v. 30 June 1953, p. 464-475; disc., p. 484-489, 501.

Development of the process; equipment used. Photographs, diagrams, tables. (G5, ST)

225-G. The Relative Merits of Presses for the Cold Extrusion of Steel. T. F. Massey. *Sheet Metal Industries,* v. 30 June 1953, p. 479-483; disc., p. 484-489, 501.

Extrusion process, general press requirements, and press selection. (G5, ST)

226-G. Mechanical Press Equipment for the Cold Extrusion of Steel. E. K. Johansen. *Sheet Metal Industries,* v. 30, June 1953, p. 476-478, 483; disc., p. 484-489, 501.

Requirements demanded in a press. Describes a 1500-ton mechanical press to be used for experimental purposes. (G5, ST)

227-G. A Review of Phosphate Coatings for Assisting Cold Extrusion. H. A. Holden. *Sheet Metal Industries,* v. 30, June 1953, p. 502-512.

Principles of phosphating, phosphate coating + lubricant, behavior of Zn-phosphate coatings before and during cold working, and phosphating practice for cold extrusion. Photographs, micrographs, tables. 36 ref. (G21, L14, Zn, ST)

228-G. Metallurgical Requirements of Steels for Cold Extrusion. D. V. Wilson. *Sheet Metal Industries,* v. 30, June 1953, p. 513-520, 522, 524.

Influence of composition on extrusion pressure, influence of microstructure, reductions attained in cold extrusion, surface quality requirements, influence of rate of straining, strain-aging, inhomogeneous deformation, stress relieving, and directionality of properties. Graphs, diagrams, micrographs. (G5, M27, Q general, ST)

229-G. Surface Grinding. Consider Coated Abrasives. Warren K. Seward. *Steel,* v. 132, sec. 1, June 22, 1953, p. 126-128, 131.

Advantages of using belts coated with a relatively thin layer of abrasive mineral and bonding agent. Photographs. (G18)

230-G. Die Design for Metal Drawing. Charles R. Cory. *Steel Processing,* v. 39, June 1953, p. 269-272.

Form dies used for producing parts where there is no tendency to form wrinkles, for bending processes, or for forming curved shapes where the metal is in a state of stretch. Diagrams. (G4)

231-G. New Forming Process Reduces Vibration and Tooling Costs. Thomas A. Dickinson. *Steel Processing,* v. 39, June 1953, p. 283-285, 302.

Use of rubber pressure pads and hydraulic shock absorbers so forming pressures or impacts will be evenly distributed over sheet metal blanks. Photographs. (G8)

232-G. Shop Characteristics of Commercial Titanium and Its Alloys. T. W. Lippert. Symposia on Materials and Design for Lightweight Construction. The Titanium Seminar. Aug. 6, 1951, p. 69-75; P.B. Report No. 111,083, U. S. Dept. of Commerce, OTS, Washington 25, D. C.

Forming, grinding, machining, and welding. (G general, K general, Ti)

233-G. (French.) Machinability of Stainless Steel. J. Daurat. *Métallurgie,* v. 85, no. 3, Mar. 1953, p. 191, 193-195.

Drilling of stainless steel. Table, diagrams. (To be continued.) (G17, SS)

234-G. (German.) Why Strip-Polishing Lubricant? W. Burkart. *Metall,* v. 7, nos. 9-10, May 1953, p. 328-330.

Attempts to justify use of lubricant in contact-grinding process. Properties of a good lubricant enumerated. Micrographs. 5 ref. (G21, G18)

235-G. (German.) Liquid Honing in Metallurgical Practice. Hans H. Finkelnburg. *Metall,* v. 7, nos. 9-10, May 1953, p. 330-334.

Relationship between grain size, coarseness, splitting honing agent grains, angle of injection, distance of jet from object, and treatment of extruded and cast forms. Photographs, graphs, diagrams. (G19)

236-G. (German.) Hard-Metal Tools for Machining of Light Metals. F. Heinrichs. *Metall,* v. 7, nos. 9-10, May 1953, p. 340-342.

Choice of materials, demands on the machine, turning, type of turning tool, surface structure of the object, lubrication, upkeep of tool and velocity of cutting. Tables, diagrams. 7 ref. (G17, T5, Al)

237-G. (German.) Present-Day Position of Machining Research. E. Bickel. *Schweizer Archiv für angewandte Wissenschaft und Technik,* v. 19, no. 4, Apr. 1953, p. 105-113.

Materials testing; research methods and measurements; criterion of dulling; and machinability as a property of a material. Photographs, graphs, diagrams. (G17)

H
POWDER METALLURGY

46-H. Powder Metallurgy. A. E. Williams. *Mining Journal* (London), Annual Review, May 1953, p. 109-111.

Developments in powders (stainless steel, Ni-Cu) and techniques. (H general, Ni, Cu, SS)

47-H. Molds for Rubber by Powder Metallurgy. *Precision Metal Molding,* v. 10, Sept. 1952, p. 31.

Alloy steel molds for rubber erasers. (H general, T29, AY)

48-H. Bearing Plates for Gear Train Redesigned From Forgings to Sinterings. *Precision Metal Molding,* v. 10, Nov. 1952, p. 27, 67-68.

Advantages of using powder metallurgy techniques. (H general, Fe)

49-H. "Pinpoint" Lubrication by Powder Metallurgy. Charles Fillinger. *Precision Metal Molding,* v. 11, Jan. 1953, p. 26-27, 86.

Applications. (H13)

50-H. Impregnation as a Method of Preparing Sinterings for Plating. Wilson N. Pratt. *Precision Metal Molding,* v. 11, Jan. 1953, p. 47-49.

Method for overcoming porosity so that parts can be satisfactorily plated. (H16, H15)

51-H. How Service Conditions and Costs Affect Design of Sintered Cams. G. L. Bachner. *Precision Metal Molding,* v. 11, Feb. 1953, p. 32-34.

Costs, service conditions, shapes, accuracy, and quantities. Photographs. (H general)

52-H. How Large a Part by Powder Metallurgy? A. J. Langhammer. *Precision Metal Molding,* v. 11, Mar. 1953, p. 34-35, 80-81.

Factors to be considered when designing powder metallurgy parts. Photographs. (H general)

53-H. Brass Sinterings Replace Extrusions and Machined Parts. P. R. Kalischer. *Precision Metal Molding,* v. 11, Apr. 1953, p. 34-35, 127.

Typical applications of brass sinterings in plumbers' goods. (H general, T6, Cu)

54-H. Chromium-Nickel Alloy Steel Sinterings. An Investigation of Physical Properties. J. D. Shaw, W. V. Knopp, and B. A. Gruber. *Precision Metal Molding,* v. 11, Mar. 1953, p. 42-45, 73-76.

Initial research phase in determining position of Cr-Ni alloys in powder metallurgy and their applicability in combination with Fe and graphite powders to produce alloy steel compositions. Tables. (H general, Cr, Ni, Fe)

55-H. Tolerance Control of Sinterings for Cost Control. Richard B. Thomson. *Precision Metal Molding,* v. 11, Apr. 1953, p. 38-40, 123-124.

Factors affecting tolerance control, tolerance figures for basic operations, control with the coining operation added, and problems of concentricity and center distance. (H14)

56-H. Now It Can Be Told How Powder Metallurgy Produces Solid Tungsten-Carbide Anti-Tank Shell Cores. *Precision Metal Molding,* v. 11, May 1953, p. 42-44.

Describes and illustrates process. (H general, T2, W, C-n)

57-H. Tiny Sintered Pinions. A Comparison With Extruded Brass. Robert J. Visin. *Precision Metal Molding,* v. 11, May 1953, p. 45-46, 75-76.

Description. (H general, G5, Cu)

58-H. Hydrometallurgical Process Yields Pure Metal Powders From Sulphides. *Journal of Metals,* v. 5, June 1953, p. 775-779.

Ammonia leach-hydrogen reduction process for Ni-Co concentrate. Tables. (H10, Ni, Cu, Co)

59-H. (German.) Mechanical Production of Metallic Powders. H. Kramer. *Metall,* v. 7, nos. 7-8, Apr. 1953, p. 262-268.

Aspects of production and operational possibilities of the vortex hammer mill. 7 ref. (H10)

60-H. Some Considerations Governing the Design and Production of Powdered Metal Components. H. M. Greenwood. *Machinery* (London), v. 82, May 29, 1953, p. 1003-1008.

Materials which may be used; porosity and impregnation; specification of physical properties, composition and accuracy; design considerations; and production trends. (H general)

61-H. (German.) Dielectric Research on Powders. R. Mecke and H. Schill. *Zeitschrift für Elektrochemie; Berichte der Bunsenegsellschaft für physikalische Chemie,* v. 57, no. 4, 1953, p. 270-276.

Indirect experimental and mathematical method of establishing accurately the dielectric constants of powder precipitates in liquids, density of the sediment, and such surface conditions as adsorption, moisture content, etc. Diagram, tables, graphs. 21 ref. (H11)

J
HEAT TREATMENT

121-J. Influence of Furnace Atmosphere on the Annealing of Malleable Iron. J. T. Bryce, A. Hernandez, and F. B. Rote. American Foundrymen's Society, Preprint 53-6, 1953, 11 p.

Effect of surface decarburization on mechanical properties. Nodule formation, pearlitic rim, and annealing rate are treated. Micrographs. (J23, CI)

122-J. Hardening Characteristics of Induction Heated Ductile Iron. Edward P. Rowady, William J. Murphy, and Joseph F. Libsch. American Foundrymen's Society, Preprint 53-31, 1953, 10 p.

Experiments on the influence of prior structure on the response to induction hardening. (J2, CI)

123-J. Low-Temperature Treatments Improve Products and Processes. W. H. Miller. *Iron Age,* v. 171, May 28, 1953, p. 121-125.

Cold treating of metal products to aid fabrication. Dimensional stabilization of precision parts; improved strength and accuracy of tools and machine parts; better machinability; and improved metallurgical properties are advantages of low-temperature treatment. (J26, Q general, Mg, Al, TS, AY)

124-J. Annealing Bombardment Damage in Solids. W. L. Brown, R. C. Fletcher, and S. Machlup. *Physical Review,* v. 90, ser. 2, May 15, 1953, p. 709-710.

Analytical expression for the annealing of isolated interstitial vacancy pairs which are presumably introduced by bombardment with particles having energies just slightly higher than threshold. (J23, M25)

125-J. Natural Gas. A Switch for Heat Treating. *Steel,* v. 132, June 1, 1953, p. 169-170.

How change from bottled gas to natural gas reduced cost of a heat treating operation. (J2)

126-J. New Heat Treat Line Meets Many Varying Requirements. *Steel Processing,* v. 39, May 1953, p. 243-245, 251.

Continuous harden, quench, and draw line. Functional and structural parts for engines, tractors, aircraft, road and construction equipment, as well as many other products are heat treated with this new installation. Photographs. (J general, AY, SS, TS)

127-J. How to Cure Protective Atmosphere Troubles. A. G. Hotchkiss and H. M. Webber. *American Machinist,* v. 97, June 8, 1953, p. 153-168.

Testing for leaks in furnaces; controlling and testing for decarburization; how to take gas samples for analysis; how protective atmospheres affect heating units and thermocouples; and effect of CO on refractories and personnel. Provides check sheet for troubles and cures in operation of protective-atmosphere furnaces. Graphs, tables, photographs. (J2)

128-J. High Frequency Induction Heating. H. A. Codelli. *Canadian Metals,* v. 16, Apr. 1953, p. 18, 20; May 20, 1953, p. 24, 26.

Shows that induction heating in sub radio-frequency range can be used effectively and economically to replace conventional methods of brazing, soldering, hardening, carburizing, and other forms of heat treatment. Chief advantages are speed, versatility, and cleanliness. Joining operations and specific applications. (J2, K7, K8)

129-J. Magnetic Annealing of a Co-Fe Alloy. A. H. Geisler, J. P. Martin, Eberhard Both, and J. H. Crede. *Journal of Metals,* v. 5, June 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 813-820.

Investigation of a 50% Co alloy to determine whether there was any direct correlation between the structure and properties of Co-Fe alloys which were given various magentic heat treatments. Diagrams, tables. 8 ref. (J23, P16, Co)

130-J. Specialized Machines, Torches Employed by National Supply to Flame Harden Oil Well Units. Todd Gardner and Hugh H. Foreman. *Western Metals,* v. 11, June 1953, p. 52-53.

Objectives, advantages, and types of flame hardening. (J2, CN, AY)

131-J. Proper Racking, Jigging & Checking Important Factors in Heat Treating Aluminum Alloys. W. P. Reno and William "Bill" Barcoff. *Western Metals,* v. 11, June 1953, p. 58-60.

Problems of holding down distortion and corrosion by dip and spray water quench. (J26, R5, Al)

132-J. Forming and Heat Treating Harrow Teeth at Mid-West Forging and Manufacturing Co. *Industrial Heating,* v. 20, June 1953, p. 1068, 1070, 1072, 1074.

Procedure. Photographs. (J general, G general)

133-J. Versatile Furnace Installation for Job Lot Heat Treatment. *Industrial Heating,* v. 20, June 1953, p. 1102, 1104, 1106, 1166.

Features and capacity of the furnace. Photographs. (J general)

134-J. Unsatisfactory Heat Treating Results. Their Causes and Prevention. M. Balicki and A. O. Moelk. *Metal Treating,* v. 4, May-June 1953, p. 2-4.

Lists and classifies unsatisfactory results. Defines causes responsible for the conditions. (J general)

135-J. Features Most Desirable in Batch Carbonitriding Equipment. George C. McCormick and Clifton E. Wenger. *Metal Treating,* v. 4, May-June 1953, p. 5-6.

Features which such equipment should contain and why they are important. Micrographs. (J28)

136-J. Stress-Relieving Furnace at Birkenhead. *Welding and Metal Fabrication,* v. 21, June 1953, p. 205-206.

Briefly described. (J1)

137-J. (French.) **International Institute of Welding. Residual Stresses and Relaxation of Stresses.** L. E. Benson, M. Hansen, and H. Harris. *Soudure et Techniques connexes,* v. 7, no. 3-4, Mar.-Apr. 1953, p. 85-86.

Summary of replies to questionnaire on stress relieving regulations and practice in different countries. (J1, Q25)

138-J. (German.) **Internally Heated Salt-Bath Furnace for Heat-Treating and Age-Hardening Light-Metal Alloys.** Ed. Zeitz. *Aluminium,* v. 29, no. 4, Apr. 1953, p. 161-163.

Design and economy. Illustrated. Tables, graphs. (J2, Al)

139-J. (German.) **Annealing Tests on Cold-Rolled Low-Alloy Strip Steels in Pot, Muffle, and Continuous-Annealing Furnaces.** Anton Pomp, Georg Niebch, and Jacques Gerhard Brockhaus. *Stahl und Eisen,* v. 73, no. 10, May 7, 1953, p. 646-653.

Elaborates on tests of six strip steels. Changes in tensile strength, yield point, and elongation caused by heat treatment are considered with respect to soft annealing. Graphs, tables. 10 ref. (J23, Q23, AY)

140-J. (German.) **Micro-Induction Hardening With High-Frequency Impulses.** W. Thorwart. *Zeitschrift des Vereines deutscher Ingenieure,* v. 95, no. 11-12, Apr. 15, 1953, p. 341-344.

Use of high-frequency current for close control of place, extent, and degree of hardness of small parts for machines and instruments. Graphs, photographs. (J2, CN)

141-J. (Book.) **Equipment for the Thermal Treatment of Non-Ferrous Metals and Alloys.** 104 p. 1953. Institute of Metals, 4 Grosvenor Gardens, London S.W.1, England. $2.50.

A compilation of the papers presented at the annual general meeting of the Institute. (J general, Cu, Ni, Al, EG-a)

K

JOINING

326-K. Wrapped Lead Makes Solderless Connector. *Electrical Manufacturing,* v. 51, June 1953, p. 150-151.

Describes and illustrates process which produces a permanently tight joint between terminal lug and connecting wire. Photographs. (K13, Ti, Pb)

327-K. Mechanized Dip Soldering of Television Receivers. K. M. Lord. *Electronics,* v. 26, June 1953, p. 130-137.

Details of new electronic production technique built around a machine that solders 424 joints at once by dipping the inverted television chassis in a pool of molten solder. Similar dip-solder machines are used for radios. Photographs. (K7)

328-K. Recent Developments in the Industrial Application of Resistance Welding. H. E. Dixon. *Institute of Welding, Transactions,* v. 16, Apr. 1953, p. 27-37.

Most important developments in resistance welding processes during recent years; their application in industry. Diagrams. (K3)

329-K. Investigation Into the Fatigue Strength of Stud Welds as Compared With Normal Screwed Studs. F. Koenigsberger and Z. Garcia Martin. *Institute of Welding, Transactions,* v. 16, Apr. 1953, p. 39-44.

Results of investigation which showed that stud welds of sound quality produced carefully have a fatigue resistance which is lower than that of rolled threads but equal to that of machine-cut threads. (K1, Q7, CN)

330-K. 3 Ways to Boost Aluminum Welding Production. H. A. Huff, Jr. *Iron Age,* v. 171, June 4, 1953, p. 146-147.

Shows that change in shielding gas, adaptation of a machine for 2-torch operation, and use of thoriated W electrodes tripled production rate of Al case boxes. Photographs. (K1, K2, Al)

331-K. Assessment of Weldability by Rapid Dilatation Tests. C. L. M. Cottrell. *Iron and Steel Institute, Journal* v. 174, pt. 1, May 1953, p. 17-24.

Transformation characteristics of 34 experimental low-alloy steels were examined in a rapid dilatometer, using a thermal cycle similar to that occurring in a known welding test. Steels were the Mn-Ni-Cr-Mo type, some containing Cu. Method by which thermal cycle occurring in the heat-affected zone of a weld is simulated in a dilatometer specimen. Tables, graphs. 16 ref. (K9, M23, AY)

332-K. How Vapor Flux Brazing Produces Quality Joints. Harold S. Card. *Materials & Methods,* v. 37, June 1953, p. 120-122.

Results in bronze welds which meet all requirements for strength, soundness, tightness, and appearance. Diagrams, photographs. (K8)

333-K. Using Two New Machines, Hold-Down Studs Go in Two at a Time. *Railway Track and Structures,* v. 49, Mar. 1953, p. 270-271.

Tests with a tie-drilling machine and stud-driving rig for installing "Racor" studs as hold-down fastenings. Twin drills and twin hammers are pre-set for positioning tools over tie-plate hold-down holes on each side of the rail so that both positions are worked on simultaneously. Photographs. (K13)

334-K. What Savings From Butt-Welded Rail? *Railway Track and Structures,* v. 49, May 1953, p. 474-475.

Based on data received in reply to a questionnaire submitted to ten railroads which had installed an excess of two miles of welded track, exclusive of tunnels. Covers first cost, maintenance, life, and salvage value of both types of rail. Photographs. (K1, A4, A8, CN)

335-K. Welding Tools and Dies. Harold S. Card. *Tool Engineer,* v. 30, June 1953, p. 58-62.

How fusion welding is used to salvage and repair worn or damaged tools and dies. Photographs. (K general, A8)

336-K. Soldering on a Production Basis. Lester F. Spencer. *Welding Engineer,* v. 38, June 1953, p. 45-49.

Pb, Sn, Bi, and Sb soft soldering alloys; strength of joints; cleaning; fluxing; fluxing agents; hand or dip soldering; and soldering of stainless steels, Al alloys, Ni, Mg, Zn, and pewter. Photographs. (K7, Pb, Sn, Bi, Sb, Al, Ni, Zn, SS)

337-K. Welded Aids to Aid Your Welding. Lucien R. Greif. *Welding Engineer,* v. 38, June 1953, p. 54-55, 70.

Hints for making welding shop aids. Photographs, diagrams. (K general)

338-K. No Leakers in These Cylinders. *Welding Engineer,* v. 38, June 1953, p. 56-57, 64.

Use of W inert-gas welding techniques for joining SAE 4130 steel shells. Photographs. (K1, AY)

339-K. Challenge to Mixer Manufacturers. Fred M. Burt. *Welding Engineer,* v. 38, June 1953, p. 58-60, 64.

Weight of concrete mixers can be reduced by using weldments and eliminating heavy castings. Photographs. (K general)

340-K. Production Line for Office Furniture. C. A. Medsker. *Welding Engineer,* v. 38, June 1953, p. 62-64.

Combination of welding torch and spot welder to produce steel cabinets and desks of fine appearance and durability. Photographs. (K2, K3, ST)

341-K. Soldering Alloys and Some of Their Uses. *Welding Engineer,* v. 38, June 1953, p. 67.

Data sheet. (K7)

342-K. Recrystallization Welding. John M. Parks. *Welding Journal,* v. 32, May 1953, p. 209s-222s.

Shear strength of welds and principal factors controlling recrystallization in pressure welding. Basic relationship between recrystallization temperature and degree of deformation is derived and analyzed. Graphs, tables, photographs. 29 ref. (K5, N5, Al, Cu, Mg, Ni, Ag, Ti, CN)

343-K. Production Welding of Steels by Gas-Shielded Arc Welding. C. J. Sullivan. *Welding Journal,* v. 32, May 1953, p. 391-396.

Production welding procedures of mild and low-alloy steels by gas-sielded arc have been developed to the stage where they are competitive in cost and quality with older methods. Graphs, tables, photographs. (K1, CN, AY)

344-K. Gases Produced by Inert Arc Welding. John J. Ferry and Gordon B. Ginther. *Welding Journal,* v. 32, May 1953, p. 396-398.

Investigation of formation of ozone and nitrogen oxides and decomposition of trichloro-ethylene vapor in the vicinity of the arc. Tables. 7 ref. (K1)

345-K. Automatic Field Welding of Girth Joints of Large Storage Tanks. Perry C. Arnold. *Welding Journal,* v. 32, May 1953, p. 399-406.

Details of a carriage for automatically making submerged-arc welds in a horizontal position. Tables, photographs. (K1)

346-K. The Inert-Gas-Shielded Metal-Arc Welding Process. W. H. Wooding. *Welding Journal,* v. 32, Apr. 1953, p. 299-312; May 1953, p. 407-423.

The process, operation of equipment, and characteristics of the arc. Graphs, diagrams, photographs. 5 ref. (K1, Al, Ni, Cu, SS)

347-K. (French.) The "Plurial" Process. M. Lebrun. *Revue Soudure,* v. 8, no. 4, 1952, p. 175-184.

A new multi-electrode process introduced in Belgium for use in fabricating "sandwich" panels. Present equipment is used. Tables. (K1, CN)

348-K. (German.) Strength of Synthetic-Resin-Glued Metallic Joints. K. Frey. *Schweizer Archiv für angewandte Wissenschaft und Technik,* v. 19, no. 2, 1953, p. 33-39.

Describes numerous tests performed on simply overlapped light metal joints glued with "Araldite." Diagrams, graphs, tables. 7 ref. (K12, Q23)

349-K. Special Fixtures Eliminate Welding Stresses in Bus Bodies. Thomas MacNew. *Automotive Industries,* v. 108, June 1, 1953, p. 66-67.

Unique type of welding buck used in producing "Mack" buses to avoid welding stresses and to maintain true alignment of the parts within close limits. (K1, Q25)

350-K. Joining Metals by Cold Pressure Welding. *Canadian Metals,* v. 16, May 20, 1953, p. 42, 44-45.

Method of joining metals by pressure alone at ordinary temperatures. No special heat or chemical treatment is required and tools can be simple. Basic facts, applications, and limitations of the process. Photographs. (K5, Al)

351-K. Some Properties and Applications of Synthetic Resin Cements. V. Evans. *Chemistry & Industry,* May 23, 1953, p. 504-509.

Synthetic resin cements used in corrosion-resisting constructions. (K12, R general)

352-K. Inert Arc Process Minimizes Oxides in Welding of Copper. John D. Kelly. *Industry & Welding,* v. 26, June 1953, p. 51-54.

Shows that inert-gas shielded-arc welding has speeded up production and increased efficiency of operation in the manufacture of Cu pressure vessels. Use of the process has also entirely eliminated necessity for preheat in the welding of heavy sections. Photographs. (K1, Cu)

353-K. 73 Spot Welding Machines Solve Aircraft Production Problem. J. R. Fullerton. *Industry & Welding,* v. 26, June 1953, p. 56-58, 60, 62, 112, 114-118.

Equipment and materials used; how to choose proper equipment for resistance welding; metal classifications; problems in utilizing machines; and resistance welding accessories. Photographs. (K3, Al, Mg, Ti, Ni, SS)

354-K. Nickel-Base Electrodes Solve a "Shattering" Problem. *Industry & Welding,* v. 26, June 1953, p. 66-68, 119.

Materials and techniques used to repair heavy cast iron case in a road grader. Photographs. (K1, CI)

355-K. Multiple Electrode Welding Speeds Submerged Arc Process. *Industry & Welding,* v. 26, June 1953, p. 88-91.

Welding process for unique control of weld shape and unusually high speeds by using two or more electrodes in tandem, transverse, or other position. Photographs. (K1)

356-K. Use A-C Arc Welding to Install Pipe Lines in Chicago Stadium. William Murray. *Industry & Welding,* v. 26, June 1953, p. 108-110.

Materials and techniques used to install an air conditioning system and an ice-making machine. Photographs. (K1)

357-K. Welding for Low Temperatures. *Metal Progress,* v. 63, May 1953, p. 190, 192, 194-196.

Condensed by W. L. Warner from "Welding for Low-Temperature Service", by Robert W. Bennett, *Alco Products Review,* v. 2, Winter 1953, p. 4-15. Qualification of metals for service at subzero temperatures in unfired pressure vessels fabricated under the ASME code was determined by means of the standard Charpy keyhole notched bar. Testing procedure and results. (K9, Q6, Cu, Al, AY)

358-K. Thread Inserts Prevent Galvanic Action in Resistance Welding Guns. *Industry & Welding,* v. 26, June 1953, p. 131-132, 134.

Use of stainless steel wire thread inserts to prevent galvanic action between dissimilar metals in portable resistance welding guns. (K3, R1, Al, Cu, SS)

359-K. The Argonaut Welding Process. *Railway Gazette,* v. 98, May 22, 1953, p. 596.

Use of inert-gas shielded arc with consumable electrode and automatic regulation. (K1)

360-K. Pressure Welding Attracts Interest. Charles Bruno and George W. Birdsall. *Steel,* v. 132, June 8, 1953, p. 90-91.

Newest joining techniques for nonferrous metals. Work can be done cold or at elevated temperatures. Both techniques are still in the development stage but appear promising, particularly for Al and its alloys. (K5, Al, Cd, Cu, Ni, Zn, Ag)

361-K. Resistance Welding Shines as Volume Producer. Jack Ogden. *Steel,* v. 132, June 8, 1953, p. 92-94.

Versatility and the ability to tie in with automatic parts handling equipment. Spot welds are laid down quickly and are accurately spaced each time. Diagrams. (K3)

362-K. (German.) Materials and Economy of Modern Gas-Envelope Welding. A. Matting. *Metall,* v. 7, nos. 7-8, Apr. 1953, p. 227-234.

Use of He and Ar. Photographs, graphs, diagrams. 12 ref. (K1)

363-K. (German.) Flow Temperatures of Ag-Cd-Cu-Zn Hard Solders. K. M. Weigert. *Metall,* v. 7, nos. 7-8, Apr. 1953, p. 247-250.

Increase of temperature by adding Cd to Ag-rich Ag-Cu-Zn alloys can be linked with the inherent, higher flow temperatures of Ag-Cd-Cu system. Test results. Flow diagrams. 9 ref. (K7, Ag, Cd, Cu, Zn)

364-K. (German.) Experiences in Oxy-Acetylene Pressure-Welding of Rails. W. Hoffmann and W. Raabe. *Schweissen und Schneiden,* v. 5, no. 3, Mar. 1953, p. 90-95.

Feasibility and economy of method for various steels. Photographs, graphs. (K2, CN)

365-K. (German.) Thermit Method of Butt-Welding Rails. Fritz Gessner. *Schweissen und Schneiden,* v. 5, no. 3, Mar. 1953, p. 95-99.

Procedures and economies of three thermit processes. Photographs, diagrams. (K4, CN)

366-K. (German.) Flash-Butt Welding of Rails and Cross-Ties. Otto Wendt. *Schweissen und Schneiden,* v. 5, no. 3, Mar. 1953, p. 99-104.

Procedures. Photographs, diagrams. (K3, CN)

367-K. (German.) Oxy-Acetylene Rail Welding in the Railway System of an Iron Works. Storcks. *Schweissen und Schneiden,* v. 5, no. 3, Mar. 1953, p. 104-107.

Extensive use of oxy-acetylene welding. Photographs, diagrams, tables. (K2, CN)

368-K. (German.) Oxy-Acetylene Rail Welding and Its Economy in Industrial and Private Railway Systems. Ferd. Mieves. *Schweissen und Schneiden,* v. 5, no. 3, Mar. 1953, p. 107-110.

Cost estimates and tabulated data. (K2, A4, CN)

369-K. (German.) Regulations for Manual Oxy-Acetylene Welding of Thin Sheet Metal. H. Killing. *Schweissen und Schneiden,* v. 5, no. 4, Apr. 1953, p. 143-145.

Procedures for welding thin ferrous and nonferrous sheet metals. Diagrams. (K2, CN)

370-K. (German.) Welded Structures for Iron and Steel Works. Friedrich Wilhelm Griese. *Stahl und Eisen,* v. 73, no. 9, Apr. 23, 1953, p. 556-567.

Influences which change stability and elastic behavior of structures. Service conditions and fabrication techniques are considered. Photographs, diagrams. 7 ref. (K general, Q21, Fe)

371-K. (German.) Repair Welding in Iron and Steel Works. Wilhelm Klapheck. *Stahl und Eisen,* v. 73, no. 9, Apr. 23, 1953, p. 568-572.

Savings gained by repair welding. Photographs. (K general, Fe)

372-K. (Swedish.) The Most Common Welding Defects. C. Hörnegren.

Svetsaren, v. 17, no. 4, 1952, p. 43-50.
X-ray detection of pores, slag inclusions, fusion layers, and fissures. Photograpns, diagrams. (K9, S13)

373-K. (Swedish.) **Advice on Future Uninterrupted Service of Sheet-Welding Machines.** Gustaf Gardtman. *Svetsaren*, v. 17, no. 4, 1952, p. 51-54.
Treatment and operation regarding procedure and layout of welding operation. Table is given which summarizes types, causes, and remedies of breakdowns. (K general)

374-K. (Swedish.) **Solution to Problem of Weld Repairing a Bridge of Steel 52.** Fritz Illing. *Svetsaren*, v. 17, no. 4, 1952, p. 55-56.
Arc welding of cracks. (K1, AY)

375-K. How Compressed Air Serves the Aircraft Industry. Edmond C. Powers. *Aero Digest*, v. 66, June 1953, p. 26-27.
Riveting equipment, drills, and saws. Equipment is used in processing Al. (K13, Al)

376-K. New Welding Technique Cuts Maintenance Costs. C. W. Brett. *Glass*, v. 30, May 1953, p. 215-218.
Techniques for repairing and maintaining production equipment. Photographs. (K general, CN)

377-K. Automobile Radiator Cores Soldered in Convection Oven. Arthur Q. Smith. *Industrial Heating*, v. 20, June 1953, p. 1146, 1148.
Process. (K7, CN)

378-K. Soldering Aluminium. Recent Advances. *Light Metals*, v. 16, June 1953, p. 194.
New soft and hard solders for Al. (K7, Al)

379-K. Welding Restores Drill Collars. R. Sneddon. *Petroleum Engineer*, v. 25, June 1953, p. B16, B18.
Machine using an oxy-acetylene heater head which produces a perfect fusion of faces by "solid phase" welding. (K2, ST)

380-K. Notes on the Use of Rivets and Other Fasteners. R. Lowell Hand. *SAE Journal*, v. 61, June 1953, p. 41-43.
Variety of problems concerning use of flush and automatic riveting; stainless steel and blind rivets; shaving of rivet heads; leakproof fasteners; tolerances; drilling; and roll pins. (K13)

381-K. Welding Thin Sections to Thick Material. Robert Thomas. *Steel Processing*, v. 39, June 1953, p. 275-276, 303.
Arc welding galvanized and black iron sheet to heavy pipe connections. Photographs. (K1, CN)

382-K. Applying Resistance Welding to Production. I. Jones. *Welding and Metal Fabrication*, v. 21, June 1953, p. 192-196.
Process, machine, tools, and maintenance. Photographs. (K3)

383-K. D. C. Plants for Argon-Arc Welding. F. Hirschmann. *Welding and Metal Fabrication*, v. 21, June 1953, p. 201-204.
Advantages of the equipment for welding mild steel and Ni alloys. Photographs, diagrams. (K1, Ni, CN)

384-K. (French.) **Large Beams Welded at the Charles III Theater in Madrid.** J. Batanero. *Ossature Metallique*, v. 18, no. 5, May 1953, p. 271-276.
Beam construction. Diagrams. (K general, T26, CN)

385-K. (French.) **Welded Arches for Industrial Structures.** J. Meuret. *Ossature Metallique*, v. 18, no. 5, May 1953, p. 284-286.
Advantages resulting from the construction of a new hall. Discusses economy, dimensions, lighting, etc. Photographs, diagrams. (K general, T26, CN)

386-K. (French.) **Joint Research of the Research Institute of Iron Metallurgy and the Institute of Welding on the Weldability of Steels. I. Program and Distribution of Work.** G. Delbart and A. Leroy; **II. Improvements of the Kinzel Test. (Notch Bend Test.)** J. P. Videau and R. Quigna; **III. Comparison and Significance of the Tests.** H. Granjon and J. P. Videau. *Soudure et Techniques connexes*, v. 7, no. 3-4, Mar.-Apr. 1953, p. 67-82; disc. p. 82-85.
Graphs, diagrams, and micrographs. (K9, ST)

387-K. (French.) **Applications of Welding and Allied Processes in the Construction and Maintenance of the Railway Tracks of the French National Railways.** O. Leduc. *Soudure et Techniques connexes*, v. 7, no. 3-4, Mar.-Apr. 1953, p. 87-91.
Problem of long sections of welded rails. Photographs. (K general, T23, CN)

388-K. (French.) **Thermit Welding of Long Sections of Welded Rails and Various Applications of Thermit Welding.** C. Naffrechoux. *Soudure et Techniques connexes*, v. 7, no. 3-4, Mar.-Apr. 1953, p. 92-100.
Material used, experimental technique, operative methods, and results. Photographs, diagrams. (K4, T23, CN)

389-K. (German and French.) **Welding of Pressure-Pipe Lines.** A. Siegenthaler. *Zeitschrift für Schweisstechnik; Journal de la Soudure*, v. 43, no. 5, May 1953, p. 100-101.
Procedure for difficult welding on compressed air pipes. (K general)

390-K. (German.) **Hard Brazing Aluminum.** E. Herrmann. *Aluminium*, v. 29, no. 4, Apr. 1953, p. 139-150.
Solders, fluxes, and methods including torch, furnace, and dip brazing. Photographs, micrographs, diagrams. (K8, Al)

391-K. (German.) **Recent Research Results on Glued Light-Metal Joints.** K. Krekeler. *Aluminium*, v. 29, no. 4, Apr. 1953, p. 151-161.
Specimen preparation, suitable testing methods, and the effects of surface conditions. Diagrams, photographs, tables, graphs. 36 ref. (K12, Al)

392-K. (German.) **Kupalu-Copper-Aluminum Welding Process.** A. Mühlinghaus. *Aluminium*, v. 29, no. 4, Apr. 1953, p. 164-165.
Procedure and equipment for resistance welding Cu to Al. Illustrated. (K3, Cu, Al)

393-K. (German.) **Electric-Arc Welding of Load-Chain Links.** A. Buchholz. *Schweissen und Schneiden*, v. 5, no. 2, Feb. 1953, p. 66-70.
Procedures of repairing chains. Tensile strength of welded chain steel is reduced by normalizing. Photographs, diagrams, tables. (K1, Q23, CN)

394-K. (German.) **Welding Malleable Iron.** F. Roll. *Schweissen und Schneiden*, v. 5, no. 2, Feb. 1953, p. 70-74.
Differences between all-black, white, and black-core malleable irons. Specifications for welding these irons are tabulated. Photographs, graphs, tables. (K general, CI)

395-K. (German.) **Systematology of Welding Methods.** H. v. Neuenkirchen. *Schweissen und Schneiden*, v. 5, no. 2, Feb. 1953, p. 74-76.
Classification of welding methods by heat sources, protective agents, and "gaps". 7 ref. (K general)

396-K. (German.) **New Standards and Specifications on the Welding of Steam Boilers and Pressure Vessels.** W. Dörrscheidt. *Schweissen und Schneiden*, v. 5, no. 5, May 1953, p. 173-183.
Diagrams, tables, graphs, and photographs. 24 ref. (K general, S22)

397-K. (German.) **Reasons for Faulty Welded Seams by Continuous Resistance Butt Welding of Tubes.** Franz Bauernfeind. *Schweisstechnik*, v. 7, no. 2, Feb. 1953, p. 13-18.
Process from standpoint of steel production and its influence on welding, strip rolling, and preparation. (K3, CN, AY)

398-K. (German.) **Causes of Defective Weld Beads in Continuous Resistance Butt Welding of Tubes.** (Concluded.) Franz Bauernfeind. *Schweisstechnik*, v. 7, no. 3, Mar. 1953, p. 34-39.
Condition of material, welding equipment, and practice are shown to be possible sources of defects. Photographs, diagrams, photomicrographs, graphs. (K3, CN, AY)

399-K. (German.) **Filler Rods for Oxy-Acetylene Welding of Steel.** C. G. Keel. *Schweizer Archiv für angewandte Wissenschaft und Technik*, v. 19, no. 4, Apr. 1953, p. 113-133.
Tests of fillers having high notch impact strength. Surveys all important hardness and deformation properties of three fillers. Relationship between H_2 content and notch impact strength. Photographs, graphs, tables, diagrams. (To be continued.) (K2, Q6, ST)

400-K. (Hungarian.) **Construction of Rail Joints by Means of Seam Welding.** Janos Szemere. *Küzlekedéstudomanyi Szemle*, v. 3, no. 1, Jan. 1953, p. 29-32.
Methods for avoiding defects and prolonging fatigue limit. Diagrams. (K3, CN)

L
CLEANING, COATING AND FINISHING

339-L. Electroplating on Beryllium. John G. Beach and Charles L. Faust. *Electrochemical Society, Journal*, v. 100, June 1953, p. 276-279.
Electrochemical and chemical activation for direct plating, and an intermediate replacement of Zn film. Diagram. (L17, Be, Zn)

340-L. Electroplating on Zirconium. W. C. Schickner, J. G. Beach, and C. L. Faust. *Electrochemical Society, Journal*, v. 100, June 1953, p. 289-291.
Methods for producing adherent electroplates on Zr. Tables, photographs. (L17, Zr)

341-L. pH. Its Meaning, Significance and Control in Plating Baths. Frank Spicer. *Electroplating and Metal Finishing*, v. 6, May 1953, p. 160-166.
Hydrogen ion concentration, buffer action, determination, measurement, and meters. Photographs, diagrams. (L17)

342-L. A Survey of Metal Spraying as Operated in Australia. Donald E. Harris. *Electroplating and Metal Finishing*, v. 6; *Metal Spraying*, v. 3, May 1953, p. 189-192.
Protective coatings applications, and metal spraying of bridge structures. (L23, CN)

343-L. Handling Controls Provide Precision Timing Through a Hot, Delicate Process. *Flow*, v. 8, June 1953, p. 78-79, 138.
Techniques in a porcelain enamel plant. Photographs. (L27)

344-L. Evolution of Vitreous-Enamel Formulae. A. W. Murdoch. *Foundry Trade Journal*, v. 94, Apr. 2, 1953, p. 389-392; May 7, 1953, p. 531-535; disc., p. 535-536.
Dry and wet-process enamels for cast iron, and wet-process enamels for sheet steel. Tables. (L27, CI, CN)

345-L. The Mechanization of Electroplating Processes. H. Silman. *In-*

stitute of Metal Finishing, Bulletin, v. 3, Spring 1953, p. 49-62.

Basic lines on which trends in plating plant mechanization will develop. (L17)

346-L. Economical Coatings by Vacuum Metallizing. Mark Shepard. *Materials & Methods,* v. 37, June 1953, p. 97-99.

How high-volume production at low cost is leading to increased application. Table, photographs. (L25, Ag, Au, Cu)

347-L. How to Clean Stubborn Deposits From Stainless Steel. *Materials & Methods,* v. 37, June 1953, p. 252, 254.

Tips on removing a variety of stains and discolorations in stainless parts fabrication. Photographs. (L10, L12, SS)

348-L. My Experience With Analytical Control of Electroplating Solutions. George B. Hogaboom. *Metal Finishing,* v. 51, June 1953, p. 93-96, 102.

Brief history of the development of electroplating solutions and procedures. (L17)

349-L. Principles of Inside Polishing and Buffing. Edwin F. Doyle. *Metal Finishing,* v. 51, June 1953, p. 97-98, 102.

Use of muslin buffs for inside polishing. Diagrams, photographs. (L10)

350-L. Mechanism of Electropolishing. P. R. Rowland. *Nature,* v. 171, May 23, 1953, p. 931.

Certain metals may be anodically polished using pure molten KCl and NaCl. 3 ref. (L13, Au, Pt, Pd, Cu)

351-L. Metallizing in the Paper Mills. *Paper Trade Journal,* v. 136, May 29, 1953, p. 19-20.

Process, equipment, and applications. (L23)

352-L. A Practical Plating Cycle Without Nickel for Zinc Die Castings. William Bluestone. *Precision Metal Molding,* v. 10, Sept. 1952, p. 45-46.

Use of Zn as a substitute for brass. Shortages also demand changes in plating materials. (L17, Cu, Zn)

353-L. Clear Protective Coatings Over Chromium Plate Systems. George Lim Poy. *Precision Metal Molding,* v. 10, Nov. 1952, p. 38-42.

Water-clear protective coatings to increase outdoor durability of the copper-flash chromium system. (L17, L26, Cu)

354-L. Polishing and Buffing Zinc Die Castings. A Preliminary to Electroplating. *Precision Metal Molding,* v. 11, Feb. 1953, p. 55-57.

Some steps in polishing and buffing die castings. (L10, Zn)

355-L. How to Select Compounds for Barrel Finishing Metal Parts. Kurt G. O. Pinke. *Precision Metal Molding,* v. 11, Apr. 1953, p. 94-95, 97-101, 103, 105, 118-122, 125-126.

Deburring, burnishing, degreasing, scale and rust removal, and abrasive compounds. (L10)

356-L. Pointers on Plating Chromium Over Aluminum Die Castings. Clarence Forestek. *Precision Metal Molding,* v. 11, May 1953, p. 51-52, 54.

Surface cleaning and plating technique. (L10, L17, Al, Cr)

357-L. What Steel for Enamelers? M. B. Gibbs and F. R. Porter. *Steel,* v. 132, June 1, 1953, p. 108-109, 131, 135.

Merits of various low-C mild steels, enameling iron, and special irons and steels. Photographs. (L27, CN, AY)

358-L. Tooling Applications of Hard Facing Alloys. *Tool Engineer,* v. 30, June 1953, p. 65-69.

Abstracted from American Society of Tool Engineers paper 21T21-1, "Tooling Applications of Hard Facing Alloys," by L. V. LaRow. Properties of hard facing alloys, "Sprayweld" process, and applications. Photographs. (L24)

359-L. Elements of Electroplating. Robert T. Kimmel. *Tool Engineer,* v. 30, June 1953, p. 75-84.

Surface control, equipment, plating racks, tanks, automatic plating machines, plant layout, and electroplating process. Diagrams, photographs. (L17)

360-L. Carbide Plating. *Automobile Engineer,* v. 43, May 1953, p. 186.

New process for plating metallic surfaces with WC to provide greater wear resistance. (L general, Mg, Ti, Al, Cu, ST, CI)

361-L. Metal Finishing for Aircraft Engines. *Canadian Metals,* v. 16, May 20, 1953, p. 48-50.

Facilities for surface treatment of metals at a gas-turbine plant. Photographs. (L general, Al)

362-L. Evaluation of Heat-Finishing Equipment. Frank Charity. *Consulting Engineer,* v. 2, Apr. 1953, p. 66-69.

Compares uses, advantages, and disadvantages of the flame-spray, heat-spray, and steam-spray units. Diagrams. (L23)

363-L. Kinetics of Galvanizing. D. J. Blickwede. *Journal of Metals,* v. 5, June 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 807-808.

Investigation on the rates of growth of the individual Fe-Zn layers over the temperature range 840 to 930° F. (L16, Zn, Fe)

364-L. Organic Protective Coatings for Metal Cans. S. L. Flugge. *Paint and Varnish Production,* v. 43, June 1953, p. 23-28, 79.

Applications of the linings and advantages of using organic compounds to coat steel plate. (L26, ST)

365-L. Influence of Operating Variables on Composition of Electroplated Lead-Tin Alloys. A. H. DuRose and D. M. Hutchison. *Plating,* v. 40, May 1953, p. 470-476, 497; June 1953, p. 630-632.

Investigation of current density, lead-tin ratio, total metal content, and addition agent content variables. Electrolytic method for determination of alloy composition was tested. Method is offered as an aid in solution control. Graphs, tables. (L17, S11, Pb, Sn)

366-L. Cleaning and Preparation of Metals for Electroplating. VI. Sensitivity of Degreasing Evaluation Tests. Henry B. Linford and Edw. B. Saubestre. *Plating,* v. 40, May 1953, p. 489-496; June 1953, p. 633-634, 639-645.

Compares sensitivities of various degreasing evaluation tests when oil residues are present as uniform films. Tables. (L17)

367-L. Some Experiences in Plating on Nickel Silver. George Schore. *Plating,* v. 40, June 1953, p. 628-629.

A series of practical and technical considerations which were followed in solving difficulties that cropped up with an especially troublesome lot of basis metal. (L general, Ni, Ag)

368-L. Designing Aluminium Components for Finishing. A. W. Brace. *Product Finishing,* v. 6, May 1953, p. 49-54.

Factors that should be considered when an Al component is being designed and finished. Various finishes available for Al and its alloys. Photographs. (L general, Al)

369-L. Recent Developments in Paint Formulations. Machine Tool Finishes. *Product Finishing,* v. 6, May 1953, p. 55-56.

Use of cellulose lacquers as a new type of machine tool finish. (L26)

370-L. Finishes for Soft Soldering. Electroplating Aluminium and its Alloys. E. E. Halls. *Product Finishing,* v. 6, May 1953, p. 57-61, 112.

Types of finishes and pretreating methods. (L17, K7, Al)

371-L. Non-Ferrous Metals Research. *Product Finishing,* v. 6, May 1953, p. 62-63.

Research on improving the quality of electroplating so that thinner protective Ni coatings may be produced. (L17, Ni)

372-L. Uses of Sprayed Metal Coatings. *Product Finishing,* v. 6, May 1953, p. 68-76.

Report on some of the purposes for which coatings have been used, both with and without the addition of paint. Discusses the main benefits of corrosion and high-temperature oxidation resistance that may be obtained with them. Photographs. (L23, L26, R general, Al, Zn)

373-L. (English.) **The Kinetics of Formation and Structure of Anodic Oxide Films on Tantalum.** D. A. Vermilyea. *Acta Metallurgica,* v. 1, no. 3, May 1953, p. 282-294.

Rate of formation was studied using aqueous electrolytes. Thicknesses of films were measured by comparing the interference colors with a calibrated step gage. Graphs, tables, micrographs. (L19, S14, Ta)

374-L. (German.) **Nickel Saving Electrolytic Tin Coatings.** H. Kalpers. *Umschau in Wissenschaft und Technik,* v. 53, no. 6, Mar. 1953, p. 174-175.

Sn-Cu, Sn-Zn, and Sn-Ni coatings. (L17, Sn)

375-L. (German.) **Bright Pickling of Steel With "Trinorm".** Heinz Anders. *Werkstoffe und Korrosion,* v. 4, no. 4, Apr. 1953, p. 122-123.

Process that produces bright surfaces and is especially suited for steels with C content up to 0.9%. (L12, CN)

376-L. Electroless Plating Produces Hard Nickel Coating. E. Lamar Gostin. *Iron Age,* v. 171, June 11, 1953, p. 115-119.

Advantages of the purely chemical process. Photographs. (L14, Ni)

377-L. New Resin Linings Give Better Container Protection. David E. Hartman. *Iron Age,* v. 171, June 11, 1953, p. 129-132.

Various linings and points to consider when selecting. Photographs. (L26)

378-L. Fighting Corrosion at a Gulf Coast Terminus by Metalizing Parts With Zinc. F. Lawrence Resen. *Oil and Gas Journal,* v. 52, June 22, 1953, p. 273-274.

Process of metalizing parts with Zn. Photographs. (L23, Zn)

379-L. Portable Welder for Oilfield Work. Max Frederick, Jr. *Petroleum Engineer,* v. 25, June 1953, p. B55, B57-B58.

Mobile equipment which can be used in hard facing worn drill pipes, subs, and drill collars. Photographs. (L24)

380-L. Finishing Army Ordnance Shells. Frank L. Bonem. *Products Finishing,* v. 17, June 1953, p. 72-78.

Finishing operations for the 105-mm., M-32 cartridge case. Prepaint treatment, painting, solution maintenance, and inspection. Photographs. (L general)

381-L. New Methods Pay Off for High Temperature Ceramic Coating. *Steel,* v. 132, sec. 1, June 22, 1953, p. 88-90.

Facilities which were designed and constructed for processing high-temperature ceramic coatings. Coating offers solution for metals that must be protected from heat. Photographs. (L27)

382-L. Carbide Flame-Plating Presents New Possibilities. W. L. Don-

nelly. *Steel Processing*, v. 39, June 1953, p. 279-282.

Applications of the process which deposits powdered metals in form of a thin coating on metal parts. WC, Al, Mg, Cu, Ni, and stainless steel were successfully deposited. Photographs. (L24, H general, W, Al, Mg, Cu, Ni, C-n, SS)

383-L. Chlorinated Rubber Finishes in Water and Sewage Works. Fred K. Shankweiler. *Water & Sewage Works*, v. 100, June 1953, p. 230-233.

Characteristics of chlorinated rubber-base paints for preventing corrosion. Successful applications in water and sewage works. (L26)

384-L. (English.) **Hydrogen Embrittlement of Steel During Electroplating. II. Zinc Electroplating.** Uno Trägardh. *Iva*, v. 24, no. 2, 1953, p. 53-71.

Electrodeposition of Zn on spring steels. Emphasizes changes of embrittlement during storage and heat treatment. Photographs, graphs, tables. 8 ref. (L17, Zn)

385-L. (French.) **The Metallic Surface. Tinning at a High Temperature.** A. Gordet. *Métallurgie*, v. 85, no. 3, Mar. 1953, p. 213, 215.

Difficulties encountered during preparation of steel surfaces. 1 ref. (To be continued.) (L17, ST)

386-L. (French.) **Continuous Cleaning.** G. Rossi-Landi. *Métallurgie*, v. 85, no. 3, Mar. 1953, p. 215, 217.

Installations in France that are being designed for the cleaning of tubes, threads, parts, etc. Compares the present continuous cleaning with that used before the war. (L10, L12)

387-L. (German.) **Present Status of Electrolytic and Chemical Burnishing (Polishing).** Heinz W. Dettner. *Metall*, v. 7, nos. 9-10, May 1953, p. 325-328.

Economy, applicability, properties of polished surfaces, bath recipes, and special electrolytes. Photographs. 1 ref. (L10, L13, Al)

388-L. (German.) **Phosphatizing of Nonferrous Metals.** A. Pollack. *Metall*, v. 7, nos. 9-10, May 1953, p. 335-336.

Parallels between phosphatizing Fe and Zn and their alloys. Photographs, tables. 8 ref. (L14, Fe, Zn)

389-L. (German.) **Zinc and Tin Coating of Steel With Antimony III Chloride Containing Hydrochloric Acid.** G. Schikorr. *Metall*, v. 7, nos. 9-10, May 1953, p. 337-340.

Failures that can occur and remedial possibilities. Graphs, tables. 6 ref. (L14, Zn, Sn, ST)

390-L. (German.) **Cross-Sectional View of Electroplating Technique in the Light of Standardization.** A. Hoch. *Metall*, v. 7, nos. 9-10, May 1953, p. 347-350.

Properties common to electrolytically produced, metallic layers. 5 ref. (L17)

391-L. (German.) **Economic Use of Anodic Oxidation and Polishing of Light-Metal Products.** V. D. Kammer. *Metall*, v. 7, nos. 9-10, May 1953, p. 361-362.

Industrial uses. Testing and exchange of experience. 16 ref. (L19, L13, Al)

392-L. (German.) **Properties of Anodically Produced Oxide Layers on Aluminum and Aluminum Alloys.** F. Solar. *Mitteilungen des chemischen Forschungsinstitutes der Wirtschaft Oesterreichs*, v. 7, no. 2, April 1953, p. 29-37.

Various layers and their properties. Graphs, tables. 10 ref. (L19, Al)

393-L. (German.) **Mechanical Descaling of Hot-Rolled Strip By Using Metallic Shot in a Centrifugal Process.** Martin Reimann and Siegfried

Schwandt. *Stahl und Eisen*, v. 73, no. 10, May 7, 1953, p. 630-639.

Fundamentals of process and tests. Advantages. Photographs, graphs, diagrams, tables. (L10, ST)

394-L. (German.) **Rust Protection Through Lead Cyanamide.** H. Zirngibl. *TVA*, v. 24, no. 2, 1953, p. 48-53.

Effectiveness of Pb cyanamide as a rust-protection pigment in highly leaded roof paints. Photographs. 3 ref. (L26, CN)

395-L. (German.) **Fluxes on Aluminum-Zinc Alloy Plating Baths.** H. Bablik, F. Götzl, and R. Kukaczka. *Werkstoffe und Korrosion*, v. 4, no. 4, Apr. 1953, p. 121-122.

Compositional changes of fluxes used in displacement plating of Zn on Al. 4 ref. (L17, Al, Zn)

396-L. (German.) **Protection Against Corrosion by Means of Sprayed-On Metal Coatings.** Hans Reininger. *Werkstoffe und Korrosion*, v. 4, no. 5, May 1953, p. 156-172.

Density and adhesiveness of the coating are indicated as the main factors which determine the success or failure of the process. Practical applications of the metal-spraying technique. Photomicrographs, diagrams, photographs, tables. 83 ref. (L23, Sn, Zn, Al)

397-L. (Hungarian.) **Anodic Oxidation Using an Alternating-Current Sulfuric-Acid Electrolyte, and the Application of the Process to the Protection of the Surface of Drawn Light-Metal Pieces in a Continuous Process.** Jozsef Antoni, Andras Domony, and Istvan Kurovszky. *Kohaszati Lapok (Aluminium)*, v. 4, no. 12, Dec. 1952, p. 268-273.

Process and results obtained in plating wire. Tables, charts. (L19, Al)

398-L. (Book-German.) **Gespritzte Metallüberzüge (Sprayed Metal Coatings).** Hans Reininger. 246 p. 1952. Carl Hanser Verlag, Munich 27, Germany. 14.80 DM.

The metallurgical fundamentals of metal spraying are treated exhaustively. 151 figures, 25 tables. (L23)

M

METALLOGRAPHY, CONSTITUTION AND PRIMARY STRUCTURES

208-M. Some Industrial Applications of Microradiography. S. Goldspiel and F. Bernstein. *Nondestructive Testing*, v. 11, May 1953, p. 15-20; disc., p. 20.

Use with gun metal and nonmetallurgical materials. Micrographs. 22 ref. (M23, Cu)

209-M. The Co-Fe-S System. W. Curlook and L. M. Pidgeon. *Canadian Mining and Metallurgical Bulletin*, v. 46, May 1953, p. 297-301.

Investigation to determine composition at which the compound $Co_{(1-x)}S$ melts congruently. Ternary system Co-Fe-S from the region of 100% $Co_{(1-x)}S$ to the region of 100% $Fe_{12}S_{13}$ was also investigated. Micrographs, tables. 7 ref. (M24)

210-M. Recent Microscopical Techniques in Metallurgy. *Metal Progress*, v. 63, May 1953, p. 182, 184, 186, 188, 190.

Condensed by S. J. Majka from "Specialized Microscopical Techniques in Metallurgy", by S. Tolansky, Symposium on Properties of Metallic Surfaces, 1952, p. 1-22, published by the Institute of Metals. General survey of the microscope as used in metallurgy, and the advantages of the more recent techniques. (M21)

211-M. A Highly Stable Automatic X-Ray Diffraction Apparatus With Only One Moving Part. Claude K. Jones. *Review of Scientific Instruments*, v. 24, May 1953, p. 380-387.

Modifications which were added to existing automatic X-ray diffraction apparatus. It was possible to produce records of X-ray diffraction patterns of a powdered crystal which can be duplicated time after time within the limit of errors introduced by the statistical arrival of the diffracted quanta. Diagrams, graphs. (M22)

212-M. Method for Cutting and Shaping Fragile Crystals. Ray Pepinsky. *Review of Scientific Instruments*, v. 24, May 1953, p. 403.

Brief description. (M23)

213-M. A Method for Improvement of Contrast of X-Ray Diffraction Photographs. David W. Levinson. *Review of Scientific Instruments*, v. 24, June 1953, p. 468-469.

Method to remove fogging of X-ray diffraction photographs by bleaching. Photographs. (M22)

214-M. (English.) **Further Notes on the Shape of Metal Grains. Space-Filling Polyhedra With Unlimited Sharing of Corners and Faces.** C. S. Smith. *Acta Metallurgica*, v. 1, no. 3, May 1953, p. 295-300.

Statement that there is a topological limit to the sharing of corners in a network of 3-dimensional cells analogous to metal grains is shown to be wrong. New space-filling irregular polyhedra sharing faces with as many as 20 neighbors are sketched. Equation is derived for the sum of angles at each vertex in a 3-dimensional space-filling array of plane-faced polyhedra. (M27)

215-M. (English.) **The Estimation of Dislocation Densities in Metals From X-Ray Data.** P. Gay, P. B. Hirsch, and A. Kelly. *Acta Metallurgica*, v. 1, no. 3, May 1953, p. 315-319.

Methods by which density of the excess dislocations of one sign in the boundaries between particles can be found from data obtained from X-ray diffraction photographs. Methods may be extended to give estimates of the excess and total dislocation densities within the particles and the densities in annealed metals. (M26, M22)

216-M. (English.) **The Structure of Gamma Manganese.** Eric R. Morgan. *Acta Metallurgica*, v. 1, no. 3, May 1953, p. 377-378.

Investigations. (M27, Mn)

217-M. (German.) **Anodic Polishing of Microsections in Metallography.** W. Strohfeld. *Aluminium*, v. 28, no. 12, Dec. 1952, p. 436-441.

Quick electrolytic process which provides easy handling and rapid attainment of a good polish. Micrographs, tables. (M21, Al)

218-M. (German.) **The Ternary Lead-Cadmium-Bismuth and Lead-Tin-Bismuth Alloys.** Teh-Hsuan Ho, Wilhelm Hofmann, and Heinrich Hannemann. *Zeitschrift für Metallkunde*, v. 44, no. 4, Apr. 1953, p. 127-129.

Ternary diagrams were redetermined because of discovery of hexagonal β-phase of Pb-Bi. Phase diagrams, photomicrographs. 7 ref. (M24, Pb, Cd, Bi)

219-M. (German.) **The Lead-Silver-Sulfur System.** Rudolf Vogel. *Zeitschrift für Metallkunde*, v. 44, no. 4, Apr. 1953, p. 133-135.

Determines equilibrium of Pb-PbS-Ag_2S phase by thermal and structural analysis. Eutectic curve was found to cross miscibility gap. Graphs, micrographs. 4 ref. (M23, Pb, Ag)

220-M. Metallurgical Characteristics of the Heavy Elements. B. W. Mott. *Research* (London), v. 6, June 1953, p. 238-246.

Published data on the heavy metals and their compounds including crystal structures, atomic sizes, valences, and magnetic properties. Tables. 27 ref. (M26, P10, P16, EG-h)

221-M. Phase Ratio Determination by an X-Ray Method. J. Gordon Parr. *Research* (London), v. 6, June 1953, p. 37s-38s.

Work on Fe-Mn alloys. (M22, Fe, Mn)

222-M. A Simplified Procedure for the Metallography of Zirconium and Hafnium and Their Alloys. F. M. Cain, Jr. Paper from Zirconium and Zirconium Alloys, p. 176-185, 1953. American Society for Metals, 7301 Euclid Ave., Cleveland 3, Ohio.

Chemical polish-etch method for metallographic preparation of Zr and Hf and their alloys without the aid of mechanical or electrolytic polishing. Remote controlled metallography of irradiated specimens, nondestructive microscopic examination of large sections, macro preparation, bright pickling, and reducing dimensional thicknesses are examples of the versatility of the chemical polish. Micrographs. (M21, Zr, Hf)

223-M. The System Zirconium-Silicon. C. E. Lundin, D. J. McPherson, and M. Hansen. Paper from Zirconium and Zirconium Alloys, p. 208-221, 1953. American Society for Metals, 7301 Euclid Ave., Cleveland 3, Ohio.

Phase diagram was determined with particular emphasis on the Zr-rich portion. Principal methods used were metallography of cast and heat treated specimens; detection of incipient melting; thermal analysis; and X-ray diffraction analysis. Micrographs, tables. (M24, Zr, Si)

224-M. The System Zirconium-Tin. D. J. McPherson and M. Hansen. Paper from Zirconium and Zirconium Alloys, p. 222-238; disc., p. 239-240, 1953. American Society for Metals, 7301 Euclid Ave., Cleveland 3, Ohio.

Highly reactive Zr-Sn alloys were prepared and heat treated under protective conditions. Phase diagram was established by metallography and X-ray diffraction; metallographic detection of incipient melting; and thermal analysis. Micrographs, tables. 6 ref. (M24, Zr, Sn)

225-M. The Zirconium-Manganese Phase Diagram. A. H. Roberson, E. T. Hayes, and V. V. Donaldson. Paper from Zirconium and Zirconium Alloys, p. 283-291, 1953. American Society for Metals, 7301 Euclid Ave., Cleveland 3, Ohio.

Constitutional diagram covering the Zr-rich portion of the Zr-Mn system was developed. Tables, micrographs. 6 ref. (M24, Zr, Mn)

226-M. (English.) **Evidence of a Band Structure in the Compton Radiation From Solids.** Kessar Alexopoulos and and Gösta Brogren. *Arkiv för Fysik*, v. 6, no. 3, 1953, p. 213-222.

Experiments carried out with copper K α-radiation scattered on Be and C under angles between 17 and 45°. Graphs. 14 ref. (M25, Be, Cu)

227-M. (French.) **Principles of Direct Determination of the Parameters of Crystalline Organization.** Jacques Mering and Jacqueline Longuet-Escard. *Comptes Rendus hebdomadaires des des Séances de l'Académie des Sciences*, v. 236, no. 15, Apr. 13, 1953, p. 1501-1503.

X-ray diffraction study of crystalline growth of nickel hydroxide. (M22, M26, Ni)

228-M. (German.) **An Improved Process of Contact Radiography.** J. Rasch. *Experientia*, v. 9, no. 4, Apr. 4, 1953, p. 149.

Use of collodion emulsions in autoradiograph technique. This technique is applicable to physiological and metallographic problems. 6 ref. (M23)

229-M. (German.) **Metallography of Light Metals. VIII. Formation and Decomposition Processes During Crystallization.** Hans Kostron and Margarete Schippers. *Zeitschrift für Metallkunde,* v. 44, no. 5, May 1953, p. 192-197.

Studies on Al to explain decomposition by heat and "concentration" waves. Micrographs. 13 ref. (M26, Al)

230-M. (German.) **Investigation of the Ternary System: Al-Fe-Zn.** Erich Gebhardt. *Zeitschrift für Metallkunde,* v. 44, no. 5, May 1953, p. 206-211.

Several boundary systems were studied. Eutectic points were determined. Micrographs, diagrams. 18 ref. (M24, Al, Fe, Zn)

231-M. (German.) **Phase Diagram of Aluminum-Magnesium System.** Klaus Eickhoff and Hugo Vosskühler. *Zeitschrift für Metallkunde,* v. 44, no. 5, May 1953, p. 223-231.

Compares data on Al-Mg system. Tables, diagrams. 72 ref. (M24, Al, Mg)

N

TRANSFORMATIONS AND RESULTING STRUCTURES

148-N. Graphitization in the Malleable Iron Industry. H. A. Schwartz, W. K. Bock, and J. D. Hedberg. American Foundrymen's Society, Preprint 53-8, 1953, 14 p.

Relationship of all recognizable variables to the rate at which graphite would separate during freezing of white cast iron. Tables. (N8, E25, CI)

149-N. The Theory of the Growth of Pearlite. E. G. Eeles. *Birmingham Metallurgical Society, Journal,* v. 33, Mar. 1953, p. 29-43.

Edgewise and sidewise nucleation and growth in iron. Graphs. (N8, Fe)

150-N. Crystallization of Nodular-Graphite Cast Iron. A. Wittmoser. *Foundry Trade Journal,* v. 94, May 14, 1953, p. 547-555.

Three earlier hypotheses developed to explain the mode of occurrence of nodular graphite in cast iron. Role of Si in the graphitization phenomena. Shows that form of the cooling curve for the iron is an indication of a fundamental change in the mode of crystallization. Diagrams, micrographs. 27 ref. (N12, N8, CI)

151-N. Continuous-Cooling Transformation Diagrams of Steels. W. Steven and G. Mayer. *Iron and Steel Institute, Journal,* v. 174, pt. 1, May 1953, p. 33-45.

Method for determination of continuous-cooling transformation diagrams that portray course of transformation with temperature in 1 to 6-in. diam. bars quenched in oil. Information derived from oil-quenched bars and from end-quench hardenability curves is compared with that provided by the continuous-cooling transformation diagrams. Graphs, tables, micrographs. (N8, ST)

152-N. The Effect of Vapor Incidence on the Structure of Evaporated Aluminum Films. L. Holland. *Optical Society of America, Journal,* v. 43, May 1953, p. 376-380.

Dependence of film granulation on vapor incidence angles was investigated for Al. Graphs. (N15, Al)

153-N. The Solubility of Silicon and Germanium in Gallium and Indium. Paul H. Keck and Jacob Broder. *Physical Review,* v. 90, ser. 2, May 15, 1953, p. 521-522.

Solubilities were determined over a wide temperature range. For the investigated systems it was found that the heats of solution are approximately proportional to the third power of the radii of the solvent atoms. Upon slow cooling of the saturated solutions Si and Ge crystals of fair purity were obtained. (N12, Si, Ge, In, Ga)

154-N. Recrystallization and Stored Energy. H. P. Leighly, H. L. Walker, and J. W. Marx. *Journal of Metals,* v. 5, June 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 809-812.

Relationship between recrystallized grain size and prior deformation is predicted from elementary statistical considerations. Reasonable agreement with experiment is obtained. 28 ref. (N5)

155-N. Concentration Gradients Associated With Growing Pearlite. Richard E. Grace. *Journal of Metals,* v. 5, June 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 820-821.

Investigation of a short tempering treatment of an Fe-C alloy which should precipitate finely dispersed Fe_3C particles in approximately the same distribution in which C existed during the growth process. (N3, N8)

156-N. Importance of the Iron Content of High-Purity Aluminum. M. Metzger and J. Intrater. *Journal of Metals,* v. 5, June 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 821-822.

Investigation which shows that, even in relatively pure Al, the behavior of the grain boundaries is strongly influenced by small amounts of other elements. Quantitative data obtained at temperatures considerably below the melting point should not be considered as good approximations to the values characteristic of boundaries in ideally pure metal. (N3, Al, Fe)

157-N. Order-Disorder Transformation in Cu-Au Alloys Near the Composition CuAu. J. B. Newkirk. *Journal of Metals,* v. 5, June 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 823-826.

Results of a Debye-Scherrer X-ray investigations which show that the order-disorder transformation is a first-order or heterogeneous reaction. Evidence was found for conventional tie-line segregation across a usual type of two-phase field separating the ordered and disordered fields in the Cu-Au equilibrium phase diagram. Graphs. 8 ref. (N10, Cu, Au)

158-N. Self-Diffusion of Iron in Iron Oxides and the Wagner Theory of Oxidation. L. Himmel, R. F. Mehl, and C. E. Birchenall. *Journal of Metals,* v. 5, June 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 827-843.

Rates of self-diffusion of Fe in artificially prepared wustites of various compositions were determined using the decrease in surface activity technique. Data are used to calculate rates. Calculated and experimental rates are compared. Graphs, tables. 43 ref. (N1, R2, Fe)

159-N. A Comparison of Zirconium With Better Known Commercial Metals. Arthur D. Schwope. *Metal Progress,* v. 63, May 1953, p. 75-81.

Compares Zr with other "transition" metals possessing allotropic transformations, such as Fe and Ti. A few basic properties, such as alloying tendencies, effect of alloying on strength, and embrittlement phenomena. Graphs. (N6, Q general, Zr, Fe, Ti)

160-N. Apparatus for Rapid Determination of Liquid-Liquid and Liquid-Solid Equilibria Involving Corrosive Materials. W. Davis, Jr., L. L. Conley, and G. P. Rutledge. *Review of Scientific Instruments,* v. 24, June 1953, p. 431-432.

Apparatus built for measurement of temperatures at which phase changes (precipitation of solid or liquid from a homogeneous solution) are observed. Diagrams. (N12, R general)

161-N. (English.) **Crystallography of Phase Transformations.** Alfred H. Geisler. *Acta Metallurgica,* v. 1, no. 3, May 1953, p. 260-281.

Microstructural and crystallographic features which are associated with transformation products are generalized on the basis of factors such as interfacial surface energy, strain energy, and diffusion. Diagrams, micrographs. 50 ref. (N general, M26, P10)

162-N. (English.) **The Formation of η Carbides.** Kehsin Kuo. *Acta Metallurgica,* v. 1, no. 3, May 1953, p. 301-304.

The formation of carbides from the viewpoint of the relative strength of the transition metal-carbon bond, atomic size factor, and possibility of the carbides being electron compounds. (N8, C-n)

163-N. (English.) **Influence of Stress on Martensite Nucleation.** J. C. Fisher and D. Turnbull. *Acta Metallurgica,* v. 1, no. 3, May 1953, p. 310-314.

Previously developed theory of martensite nucleation is extended to include influence of external stresses. Importance of stresses produced by plastic deformation prior to transformation and presence of a few dislocations in annealed austenite are discussed qualitatively. (N8, N9, Q25)

164-N. (English.) **Note on the Formation and Development of Cells in Polycrystalline Zinc.** R. C. Gifkins and J. W. Kelly. *Acta Metallurgica,* v. 1, no. 3, May 1953, p. 320-324.

Technique of multiple-beam interferometry was used to study formation and development of cell substructure in polycrystalline Zn. Micrographs. (N5, M23, Zn)

165-N. (English.) **The Hardening of Metal Crystals by Precipitate Particles.** J. C. Fisher, E. W. Hart, and R. H. Pry. *Acta Metallurgica,* v. 1, no. 3, May 1953, p. 336-339.

Dependence of the hardening effect of precipitate particles is computed in terms of a model in which the precipitate particles cause the dislocations from activated Frank-Read source to form closed loops about the particles. Results of the analysis are shown to be in agreement with the relevant experimental data. (N7)

166-N. (English.) **On the Porosity Observed in the Kirkendall Effect.** F. Seitz. *Acta Metallurgica,* v. 1, no. 3, May 1953, p. 355-369.

Interprets formation of voids in the Kirkendall experiment in terms of preceding analyses of vacancy diffusion. Studies of the formation of voids in Cu-Ni, Cu-Zn, Cu-Al and Ag-Au make it possible, with suitable assumptions, to estimate the lifetime of a vacancy in this system. 20 ref. (N1, Cu, Ni, Zn, Al)

167-N. (English.) **Crystallographic Aspects of the Beta to Alpha Transformation in Titanium.** J. B. Newkirk and A. H. Geisler. *Acta Metallurgica,* v. 1, no. 3, May 1953, p. 370-374.

Orientation of the α lattice with respect to its parent β lattice; na-

ture of striations found in the macrostructure and their relation to the habit plane of an acicular product; and phenomenon of reversion to the original lattice orientation of an isolated α crystal after it has been heated into the β range and cooled. Micrographs. (N6, Ti)

168-N. (English.) **Thermal Stabilization of Austenite Iron-Carbon-Nickel Alloys.** Samuel J. Rosenberg. *Acta Metallurgica,* v. 1, no. 3, May 1953, p. 376.

Varying the cooling rate from 1400 to 5000° F. per sec. in the temperature range 1300 to 900° F. had no significant effect on the temperature of M_s in two Ni alloys. (N8, Ni)

169-N. (German.) **A Simple Method for Preparation of Al Monocrystals of Fixed Orientation.** Helmut Weik. *Zeitschrift für angewandte Physik,* v. 5, no. 3, Mar. 1953, p. 119-120.

Process for making monocrystals from Al wire. Orientation can be controlled to 1 or 2°. Diagrams. 3 ref. (N5, Al)

170-N. (German.) **Reactions of Solid Iron With Molten Aluminum and Aluminum Alloys.** Erich Gebhardt and Walter Obrowski. *Zeitschrift für Metallkunde,* v. 44, no. 4, Apr. 1953, p. 154-160.

Examines growth layers of solid Fe with molten Al and several Al alloys, by measuring thicknesses of layers; studying their microstructures; testing hardness; and X-raying and chemical analyses. Tables, graphs, photomicrographs. 20 ref. (N12, Fe, Al)

171-N. The 475° C Hardening Characteristics of Some High-Alloy Steels and Chromium Irons. B. Cina and J. D. Lavender. *Iron and Steel Institute, Journal,* v. 174, pt. 2, June 1953, p. 97-107.

Phenomenon of "475° C. embrittlement" was observed in certain duplex ($\gamma + \delta$) high alloy steels after treatment from 350 to 525° C. Its development was investigated by measurement of hardness, electrical resistivity, and magnetic and mechanical properties; microstructural changes; and by X-ray diffraction studies of filings, block samples, and electrolytically extracted residues. Comparative work was carried out on two Cr irons. Graphs, tables, micrographs. 24 ref. (N8, M23, AY, CI)

172-N. Recovery of Cold-Worked Zirconium. W. A. Bostrom and S. A. Kulin. Paper from Zirconium and Zirconium Alloys. p. 186-196. 1953. American Society for Metals, 7301 Euclid Ave., Cleveland 3, Ohio.

Annealing of cold worked Zr was studied as a function of time at temperature by measurement of changes in electrical resistance. Noticeable recovery occurred even at 100° C. and recovery was quite rapid at the higher tempertures studied. Graphs. 9 ref. (N4, J23, Zr)

173-N. The Solid Solubility of Tin in Alpha Zirconium. G. R. Speich and S. A. Kulin. Paper from Zirconium and Zirconium Alloys. p. 197-207. 1953. American Society for Metals, 7301 Euclid Ave., Cleveland 3, Ohio.

Solid solubility was determined at high temperatures by changes in lattice parameter and at low temperatures by a strain aging technique. Limitations of method for determination of low-temperature solubilities. Graphs, tables. 8 ref. (N12, Zr, Sn)

174-N. Observations on the Alpha-Beta Transformation in Zirconium. E. E. Hayes and A. R. Kaufmann. Paper from Zirconium and Zirconium Alloys. p. 241-253. 1953. American Society for Metals, 7301 Euclid Ave., Cleveland 3, Ohio.

Observable characteristics of the transformation of pure Zr were found to differ in two respects from impure Zr. Investigations and results. 11 ref. (N6, Zr)

175-N. (English.) **On the Solid-Liquid Transformation in Metals.** G. Borelius. *Archiv för Fysik,* v. 6, no. 3, 1953, p. 191-206.

Thermodynamic calculations based on assumption of continuity between solid and liquid states and separation of the internal energy of metals into parts of vibrational and structural origin. Leads to new possibilities of interpretating subcoolability of liquid metals and thermal expansion phenomena. Graphs. 35 ref. (N12, P11, P12)

176-N. (English.) **On Fusion as Order-Disorder Transition.** G. Borelius. *Arkiv för Fysik,* v. 6, no. 3, 1953, p. 207-212.

Solid-liquid transition as an order-disorder phenomenon demonstrating characteristic differences between the two phenomena. Graphs. (N12, N10)

177-N. (German.) **Course of Diffusion Processes in Substitutive Solid Solutions.** Theo. Heumann and Alfons Kottmann. *Zeitschrift für Metallkunde,* v. 44, no. 4, Apr. 1953, p. 139-154.

Explains Kirkendall effect by reviewing literature which substantiates Darken theory of partial-diffusion coefficients. Graphs, tables, photomicrographs. 63 ref. (N1)

178-N. (German.) **Particle-Size-Distribution During Recrystallization of Pure Aluminum.** Werner Dickenscheid and Hugo Josef Seemann. *Zeitschrift für Metallkunde,* v. 44, no. 5, May 1953, p. 211-216.

Tests were made on rolled, pure Al. The Dederichs-Kostron method was used. Tables, figures. 23 ref. (N5, Al)

179-N. (German.) **Hardening of Aluminum-Silver Alloys. VII. Concentration Dependence of Hardening.** Werner Köster and Franz Sperner. *Zeitschrift für Metallkunde,* v. 44, no. 5, May 1953, p. 217-219.

States of hardening of 50-50 Al-Ag alloys at temperatures between 100 and 300° C. Comparison with 38% Ag alloy. 3 ref. (N7, Al, Ag)

180-N. (German.) **Structure of Thin Silver Deposits.** H. Göttsche. *Zeitschrift für Physik,* v. 134, no. 5, 1953, p. 517-525.

Refraction diagrams show that thin vapor deposits of Ag have no hexagonal Ag phase. The effect of displacements of the crystallites (slight bending, breaking, or curving of the deposit) and of irregular lattice defects on the interference picture are investigated. Diagrams, tabulated data. 8 ref. (N15, Ag)

181-N. (Book.) **Graphite Formation in Ductile Cast Irons.** V. A. Altekar and Luiz Antonio de Araujo. 67 p. Dept. of Publications, Colorado School of Mines, Golden, Colo. $1.00.

Study of the formation of nodular graphite in cast irons, and the production of nodular cast iron with calcium. Chemical and thermal factors affecting graphitization. History of research regarding formation of graphite in spheroidal or nodular form and theories of nodulization. (N8, CI)

P

PHYSICAL PROPERTIES AND TEST METHODS

310-P. Vapor Pressures of Inorganic Substances. XI. Titanium Between 1587 and 1764° K., and Copper Between 1143 and 1292° K. James W. Edwards, Herrick L. Johnston, and Walter E. Ditmars. *American Chemical Society, Journal,* v. 75, May 20, 1953, p. 2467-2470.

Vapor pressures of Cu and Ti were determined using the Langmuir method of vacuum evaporation. Heats of sublimation at absolute zero were calculated; and equations for the vapor pressure, as functions of temperature, were formulated. Graphs, tables. (P12, Ti, Cu)

311-P. Ferromagnetism and Order in Nickel-Manganese Alloys. G. R. Piercy and E. R. Morgan. *Canadian Journal of Physics,* v. 31, May 1953, p. 529-536.

Investigation of ferromagnetism in Ni-Mn alloys containing up to 40 atomic % Mn. Alloys within this composition range were subjected to heat treatments such that the atomic arrangement within the alloys varied from disorder to a high degree of long-range order. Degree of order of Ni_3Mn calculated from measured saturation magnetization using the atomic model of ferromagnetism was consistent with the value calculated from the ratio of measured integrated intensity of the (110) X-ray diffraction superlattice line to that of line (111). Graphs. 11 ref. (P16, N10, Ni)

312-P. Determining Properties of Bulk Semiconductors. R. B. McQuistan. *Electronics,* v. 26, June 1953, p. 150-155.

Resistance-temperature characteristics of bulk Ge and other semiconductors are determined oscillographically by pulse-heating method. Measurement from temperature of liquid H_2 to 650° K. takes less than a second. Diagrams. 8 ref. (P15, Ge, Au)

313-P. Adsorption by Evaporated Copper Films at 78° K. I. Krypton and Hydrogen. II. Krypton and Oxygen. G. L. Kington and J. M. Holmes. *Faraday Society, Transactions,* v. 49, Apr. 1953, p. 417-432.

Experimental data. Graphs. 34 ref. (P13, Cu)

314-P. The Development of Titanium Carbides. J. Lomas. *Machinery Lloyd* (Overseas Ed.), v. 25, May 9, 1953, p. 81, 83-84.

Physical and mechanical properties. (P general, Q general, Ti, C-n)

315-P. Metal Physics Work of the Division of Tribophysics, C.S.I.R.O. W. Boas. *Nature,* v. 171, May 23, 1953, p. 908-910.

Work aimed at a better understanding of the properties and behavior of metals and alloys. (P general)

316-P. Determination of the Relative Electrode Potential of an Uncharged Metal in Solution. J. O'M. Brockris and R. Parry-Jones. *Nature,* v. 171, May 23, 1953, p. 930-931.

A method of determining the potential of a charge-free surface at a solid metal-solution interface. 9 ref. (P15, Zn, Pb, Cd, Cu, Ni)

317-P. Optical Properties of Bismuth in the Near Infrared. L. G. Schulz. *Optical Society of America, Journal,* v. 43, May 1953, p. 406-407.

Optical and electrical properties of metal films. (P17, P15, Bi)

318-P. The Transmission of Electrons Through Thin Metallic Foils. C. H. Chang, C. S. Cook, and H. Primakoff. *Physical Review*, v. 90, ser. 2, May 15, 1953, p. 544-547.

Experimental studies were made on the relative transmission of positrons and negatrons through Al and Pt windows of an end-window-type G-M counter. Theoretical transmission curves, with an empirically determined constant, were developed. Graphs. 13 ref. (P10, Al, Pt)

319-P. Photomesonic Fission of Bismuth. G. Bernardini, R. Reitz, and E. Segre. *Physical Review*, v. 90, ser. 2, May 15, 1953, p. 573-574.

Fission of Bi by high-energy photons was detected by a photographic plate technique. Some measurements on the cross section as a function of the photon energy are reported. 13 ref. (P13, Bi)

320-P. Radiochemical Studies on the Photofission of Thorium. Dale M. Hiller and Don S. Martin, Jr. *Physical Review*, v. 90, ser. 2, May 15, 1953, p. 581-585.

Report on the radiochemically determined yields of 13 nucleon (mass) numbers produced by the irradiation of Th with 69-Mev bremsstrahlung. Graphs. 20 ref. (P13, Th)

321-P. Nuclear Levels Associated With Zirconium 95 and Niobium 95. J. M. Cork, J. M. LeBlanc, D. W. Martin, W. H. Nester, and M. K. Brice. *Physical Review*, v. 90, ser. 2, May 15, 1953, p. 579-581.

A study was made of the β and γ-energies and of the half-lives associated with the radioactive decay. Tables. (P13, Zr, Cb)

322-P. Comparison of the Values of the Disintegration Constant of Be^7 in Be, BeO, and BeF_2. J. J. Kraushaar, Elizabeth D. Wilson, and Kenneth T. Bainbridge. *Physical Review*, v. 90, ser. 2, May 15, 1953, p. 610-614.

Difference in the decay constants were measured using the differential ionization chamber technique. Graphs, tables. 15 ref. (P13, Be)

323-P. The Total Neutron Cross Sections of Gold, Chlorine, and Phosphorus. S. C. Snowdon and W. D. Whitehead. *Physical Review*, v. 90, ser. 2, May 15, 1953, p. 615-618.

Total neutron cross sections were measured over the energy range 100 to 700 kev using the mono-energetic neutrons from the $H^3(p,n)He^3$ reaction with an energy resolution of about 40 kev. Graphs. 9 ref. (P10, Au)

324-P. Total Cross Sections of Chlorine, Sodium, Titanium, and Bromine for Fast Neutrons. H. R. Dvorak and R. N. Little, Jr. *Physical Review*, v. 90, ser. 2, May 15, 1953, p. 618-622.

Relatively new liquid scintillation counter methods were adapted to detect fast neutrons with a heretofore unattainable efficiency of about 19%. Graphs. 21 ref. (P10, Na, Ti)

325-P. The Extra-Resistivity Owing to Vacancies in Copper. P. Jongenburger. *Physical Review*, v. 90, ser. 2, May 15, 1953, p. 710-711.

Calculations for the extra resistivity show that it is of the same order of magnitude as the extra-resistivity due to Ni in Cu. (P15, Cu, Ni)

326-P. Some Physical Properties of Investment Cast Alloys. K. J. Yonker. *Precision Metal Molding*, v. 11, Feb. 1953, p. 42-43.

Physical and mechanical properties of alloy and stainless steels. Tables. (P general, Q general, AY, SS)

327-P. A Survey of Present Knowledge of Thermionic Emitters. D. A. Wright. *Institution of Electrical Engineers, Proceedings*, v. 100, pt. III, May 1953, p. 125-139; disc., p. 140-142.

Factors influencing the work function of metals. Usefulness of a number of metals as practical thermionic emitters. Effect of adsorbed films, illustrated in connection with emitters with monatomic layers of Th, Cs, and Ba. Behavior and limitations of Ba-Sr-O type of cathode. Tables. 70 ref. (P15, Ba, Th, Cs, Sr)

328-P. Antiferromagnetic Structure in Cr_2O_3. B. N. Brockhouse. *Journal of Chemical Physics*, v. 21, May 1953, p. 961-962.

Investigation of magnetic structure by neutron diffraction studies of powdered Cr_2O_3 at 22 and $-193°$ C. using neutrons of wavelength 1.303A obtained from a crystal spectrometer. 6 ref. (P16, M22, Cr)

329-P. "Cond-Al". A Tailor-Made Aluminum Alloy of High Creep Strength and Conductivity. R. H. Harrington, L. B. Barker, M. F. Sayre, and C. H. Holley. *Metal Progress*, v. 63, May 1953, p. 90-94.

Investigation to produce a commercially available alloy with electrical conductivity close to that of E. C. Al but with greatly improved rupture and tensile properties; higher recrystallization temperature; and greater resistance to compression creep at operating temperatures. Tables. (P15, Q3, T1, Al)

330-P. Measuring Methods for Some Properties of Ferroxcube Materials. C. M. van der Burgt, M. Gevers, and H. P. Wijn. *Philips Technical Review*, v. 14, no. 9, Mar. 1953, p. 245-256.

A resonance method is applied for measurement of the permeability and the losses of Ferroxcube materials in weak fields. Measuring circuit consists of either lumped network elements or a coaxial line with or without a lumped inductance or capacitance. Diagrams. (P16)

331-P. Table of Isotopes. J. M. Hollander, I. Perlman, and G. T. Seaborg. *Reviews of Modern Physics*, v. 25, Apr. 1953, p. 469-651.

Table presents data on all isotopes known in Dec. 1952. Reference data. (P13)

332-P. (English.) **Ionic Currents in Thin Films of Zirconium Oxide.** A. Charlesby. *Acta Metallurgica*, v. 1, no. 3, May 1953, p. 340-347.

Ionic currents and laws of growth. Optical methods show film to be uniform in structure. Optical and capacity measurements were used to measure thickness. Effect of varying type of electrolyte was studied. Graphs, tables. (P15, P17, Zr)

333-P. (English.) **Electron and Photocurrents in Thin Films of Zirconium Oxide.** A. Charlesby. *Acta Metallurgica*, v. 1, no. 3, May 1953, p. 348-354.

Flow of electron and photo-electric currents when electrostatic fields are applied across thin oxide films formed on Zr by electrolytic means. Tables, graphs. (P15, Zr)

334-P. (English.) **Specific Heat and Energy of Transformation of Mg_3Cd.** B. Welber, R. Webeler, and F. Trumbore. *Acta Metallurgica*, v. 1, no. 3, May 1953, p. 374-376.

Determination of specific heat between 50 and 200° C. (P12, Mg, Cd)

335-P. (German.) **Fission of Beryllium by Mesons.** A. P. Shdanow, P. I. Lukirskij, and S. S. Sokolowa. *Chemische Technik*, v. 5, no. 1, Jan. 1953, p. 22-23.

By meson bombardment a single highly ionized particle of Be was split off. The particle has two neutrons. 4 ref. (P10, Be)

336-P. (German.) **A New Kind of Heat Transfer.** Otto Schaaber. *Umschau in Wissenschaft und Technik*, v. 53, no. 6, Mar. 1953, p. 163-166.

Transfer in a melt of pure metal in stationary status was tested. Conductors are considered as perfectly arranged areas of molecules which have higher specific gravity than the surrounding melt and are attracted by convection currents to the hotter side. Graphs, diagrams. (P11)

337-P. (German.) **Results of Low-Temperature Testing. X. Atomic Heat of Indium Between 12° and 273° K.** Klaus Clusius and Liselotte Schachinger. *Zeitschrift für angewandte Physik*, v. 4, no. 12, Dec. 1952, p. 442-444.

Atomic heat is represented as a function of a definite Debye characteristic temperature. (P12, In)

338-P. (German.) **Nuclear Photo Effect on Beryllium at High Energies.** Herbert Uberall. *Zeitschrift für Naturforschung*, v. 8a, nos. 2-3, Feb.-Mar. 1953, p. 142-148.

Theoretical discussion. (P12, Be)

339-P. The Specific Heat of Beryllium at Low Temperatures. R. W. Hill and P. L. Smith. *Philosophical Magazine*, v. 44, June 1953, p. 636-644.

Measurements were made from 4 to 300° K. Results obtained are consistent with the most recent high-temperature data but are markedly different from existing low-temperature work. (P12, Be)

340-P. The Thermal and Electrical Conductivities of Beryllium. R. W. Powell. *Philosophical Magazine*, v. 44, June 1953, p. 645-663.

Several samples of metallic Be were studied. Heat treatment to 700° C. caused increases in the thermal and electrical conductivities. Determinations of these properties were made for as received and heat treated states. Graphs, tables. (P11, P15, Be)

341-P. Thermionic Constants of Metals and Semiconductors. III. Monovalent Metals. S. C. Jain and K. S. Krishnan. *Royal Society, Proceedings*, v. 217, ser. A, May 21, 1953, p. 451-461.

Measurements on the thermionic constants of Cu, Ag and Au made by the effusion method. (P15, Cu, Ag, Au)

342-P. The Kinetics of Chemisorption of Hydrogen and Carbon Monoxide on Evaporated Iron Films. A. S. Porter and F. C. Tompkins. *Royal Society, Proceedings*, v. 217, ser. A, May 21, 1953, p. 529-544.

Investigation at liquid-air temperatures. Graphs, tables. (P13, Fe)

343-P. The Sorption of Hydrogen and Other Gases by Evaporated Iron Films. A. S. Porter and F. C. Tompkins. *Royal Society, Proceedings*, v. 217, ser. A, May 21, 1953, p. 544-554.

Sorption of H_2, CO and N_2 on evaporated Fe films was investigated. Evaluation of the surface areas from chemisorption data. Graphs, tables. (P13, Fe)

344-P. (English.) **The Decay Energies of Pb^{209} and Si^{31}.** A. H. Wapstra. *Arkiv för Fysik*, v. 6, no. 3, 1953, p. 263-267.

Intermediate image β-spectrometer was calibrated with electron lines of known energy. β-decay energies of Pb^{209} and Si^{31} were determined. Tables, graphs. (P13, Pb, Si)

345-P. (French.) **Iron Nitriding in the Neighborhood of the Curie Ferromagnetic Point.** Georges Nury and Hubert Forestier. *Comptes Rendus hebdomadaires des Séances de l'Académie des Sciences*, v. 236, no. 15, Apr. 13, 1953, p. 1487-1489.

The velocity of nitriding has two very marked discontinuities at 740 and 760° C, expressed by two sharp maxima. The first is due to ferromagnetic transformation of a Fe-N solid solution, the second to the Curie point of Fe. (P16, Fe)

346-P. (German.) **Electrical Behavior of Thin Metallic Layers.** A. Schulze and H. Eicke. *Metall*, v. 7, Feb. 1953, p. 106-108.

Research set-up and related procedures. (To be continued.) (P15)

347-P. (German.) **A New Class of Permanent Magnet Materials.** *Umschau in Wissenschaft und Technik,* v. 53, no. 9, May 1, 1953, p. 265-266.
New metallic oxides. (P16, Fe, Co)

348-P. (German.) **The Vapor Pressure of Magnesium Over Its Binary Molten Alloys With Antimony and Bismuth. XV. The Thermochemistry of Alloys.** F. A. Vetter and O. Kubaschewski. *Zeitschrift für Elektrochemie; Berichte der Bunsengesellschaft für physikalische Chemie,* v. 57, no. 4, 1953, p. 243-247; disc. p. 247-248.
Reactivity of Mg in the melts can be determined from the vapor pressures, heats and entropies of solution, and temperature coefficients. Tables, graphs. 15 ref. (P12, Mg, Sb, Bi)

349-P. (German.) **New Semiconducting Compounds. II.** H. Welker. *Zeitschrift für Naturforschung,* v. 8a, no. 4, Apr. 1953, p. 248-251.
Conductivity measurements on InSb, GaSb, and AlSb as functions of temperature. Charts, tables. (P15, In, Ga, Al, Sb)

Q

MECHANICAL PROPERTIES AND TEST METHODS; DEFORMATION

470-Q. Performance of Cast and Rolled Steels in Relation to the Problem of Brittle Fracture. W. S. Pellini, F. A. Brandt, and E. E. Layne. American Foundrymen's Society, Preprint 53-3, 1953, 19 p.
Shows that Charpy V and keyhole notch toughness of cast and rolled steels are similar. Theoretical and engineering aspects are discussed. (Q23, Q26, CI, CN)

471-Q. Mechanical Properties of Cast Titanium-Carbon Alloys. O. W. Simmons and R. E. Edelman. American Foundrymen's Society, Preprint 53-48, 1953, 5 p.
Tensile strength and melting temperatures in relation to C content. Micrographs. (Q23, P12, Ti)

472-Q. Prediction of Mechanical Properties From Chemical Composition for Fully-Annealed Ductile Cast Iron. C. C. Reynolds, C. M. Adams, and H. F. Taylor. American Foundrymen's Society, Preprint 53-51, 1953, 6 p.
Correlation between mechanical properties and composition of ferritic ductile irons. Methods of calculation are described. Graphs, tables. (Q general, CI)

473-Q. Characteristics of High-Strength Magnesium Casting Alloy ZK61. J. W. Meier. American Foundrymen's Society, Preprint 53-54, 1953, 9 p.
Compared with other Mg casting alloys. Graphs. (Q general, Mg)

474-Q. A Review of the Temper Brittleness Phenomenon. K. T. Goodchild. *Birmingham Metallurgical Society, Journal,* v. 33, Mar. 1953, p. 8-28.
Temper brittleness in steels and nonferrous metals. Effects of alloying elements and heat treatment processes on the embrittlement. Theories to explain temper brittleness. 24 ref. (Q23, J general, ST, EG-a)

475-Q. Typical Brinell Hardness Numbers of Some Nonferrous Alloys. *Foundry,* v. 81, June 1953, p. 175-176.
Tabulated information for Cu-base Al, and Mg alloys. (Q29, Cu, Al, Mg)

476-Q. Cracks and Hot Tears in Steel Castings. John B. Caine. *Foundry,* v. 81, June 1953, p. 120-127, 289-297.
Reviews and re-evaluates results of previous investigations in the light of more recent studies. Correlates various data and shows some order in seemingly conflicting information. Diagrams, graphs. (Q26, CI)

477-Q. Strain Ageing of Mild Steel. Effects of Vanadium or Chromium on the Strain Ageing of Rimming Steels. W. R. D. Jones and G. Coombes. *Iron and Steel Institute, Journal,* v. 174, pt. 1, May 1953, p. 9-15.
Effects of small amounts of V and Cr on strain aging, rimming action, and mechanical properties of low-carbon rimming steels. Results for V-treated rimming steels made on a laboratory scale and on a works scale by basic openhearth and basic bessemer processes. Explanation for effects of V, based on thermodynamic data; results are discussed with reference to the dislocation theory. Tables, graphs. (Q general, P12, Cr, V, CN)

478-Q. The Cleavage Strength of Polycrystals. N. J. Petch. *Iron and Steel Institute, Journal,* v. 174, pt. 1, May 1953, p. 25-28.
Mild steel, ingot iron, and spectrographic iron were used in an investigation to determine why coarse-grained steels are more prone to brittle fracture than fine-grained ones. Graphs. (Q26, M27, Fe, CN)

479-Q. Creep Properties of Titanium. D. R. Luster, W. W. Wentz, and D. W. Kaufmann. *Materials & Methods,* v. 37, June 1953, p. 100-103.
Shows that commerically pure Ti has useful creep characteristics in the temperature range up to 750° F. Graphs, photograph. (Q3, Ti)

480-Q. Interim Report on a Fatigue Investigation of a Full-Scale Transport Aircraft Wing Structure. M. James McGuigan, Jr. National Advisory Committee for Aeronautics, Washington, D. C., Technical Note 2920, Apr. 1953, 36 p.
Tests were conducted by the resonant-frequency method at a level of 1±0.625g. or about 22±14% of the design ultimate load factor. Graphs, tables, diagrams, photographs. (Q7, Al)

481-Q. Creep of Copper Under Stress Pulses. A. J. Kennedy. *Nature,* v. 171, May 23, 1953, p.927-928.
Behavior of Cu conductors subjected to intermittent stresses. Graphs. (Q3, Q25, Cu)

482-Q. Wear-Resistance Combined With Softness in Bronze Plaster Mold Castings. Walter Speiser. *Precision Metal Molding,* v. 11, May 1953, p. 39.
Applications to honing tools. (Q9, T6, Cu)

483-Q. Offers Suggestions for Practical Uses of Research Findings. G. M. Magee. *Railway Track and Structures,* v. 49, May 1953, p. 470-473.
Considers impact from joints, reformed bars, "Rocking Chair" ties, control of tie wear, and Mn crossing frogs. Photographs. (Q6, Mn, CN, AY)

484-Q. An Evaluation of Plastic Analysis as Applied to Structural Design. Bruce G. Johnston, C. H. Yang and Lynn S. Beedle. *Welding Journal,* v. 32, May 1953, p. 224s-239s.
Design problems and trends in the application of plastic analysis as applied to structural design. Graphs, photographs. 33 ref. (Q23)

485-Q. Plastic Strength and Deflections of Continuous Beams. K. E. Knudsen, C. H. Yang, Bruce G. Johnston, and Lynn S. Beedle. *Welding Journal,* v. 32, May 1953, p. 240s-256s.
Possible savings by using plastic design as distinguished from conventional elastic design. Suggestion for specific design criteria. Diagrams, graphs, 22 ref. (Q23, Q21, CN)

486-Q. (German.) **Testing of Load Signals of Fatigue-Testing Machines.** Max Hempel and Kurt Fink. *Archiv für das Eisenhüttenwesen,* v. 24, no. 1-2, Jan.-Feb. 1953, p. 83-91.
Suitability of bonded strain gage as test device. Distinction was made between influences stemming from machine construction, bearing or cylinder welds, and negligence in servicing. Graphs, diagrams. 12 ref. (Q25, Q7)

487-Q. (German.) **Properties of a Useful Cu-Cr Alloy.** Gerhard Bunge, Eduard R. Honak, and Walter Nielsch. *Zeitschrift für Metallkunde,* v. 44, no. 2, Feb. 1953, p. 71-76.
Mechanical and physical properties at various treatment stages. Possible applications. (Q general, P general, Cu)

488-Q. (Russian.) **Systems of Differential Equations for First Order Elliptic-Type and Boundary Problems. Applications to the Shell Theory.** I. N. Vekua. *Matmaticheskii Sbornik,* v. 31, no. 2, Sept.-Oct. 1952, p. 217-314.
Theoretical stress analysis. (Q25)

489-Q. Physical Properties of Steel as Functions of the Tempering Temperature. A. A. Peebles. *Engineering,* v. 175, May 15, 1953, p. 613-615.
Shows that principal physical properties may be expressed as mathematical functions of the tempering temperatures. Major physical properties can be deduced from any one of such properties which has been experimentally determined. Graphs. (Q general, J29, AY)

490-Q. The Influence of the Rate of Deformation on the Tensile Properties of Some Plain Carbon Sheet Steels. Joseph Winlock. *Journal of Metals,* v. 5, June 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 797-803.
What takes place at the yield point, and the influence of the rate of deformation. Graphs, micrographs. 20 ref. (Q23, Q24, CN)

491-Q. Some Mechanical Properties of Forgings in Titanium Alloy 150A. Thomas Reynolds and W. T. Edmunds. *Light Metals,* v. 16, June 1953, p. 187-190.
Results from forgings made by a given technique. Tables, photographs. (Q general, Ti)

492-Q. Rapid Calculation of Microhardness Numbers. L. E. Samuels and T. O. Mulhearn. *Metal Progress,* v. 63. May 1953, p. 82-83.
Two methods for the calculation of indentation microhardness numbers. (Q29)

493-Q. Ultra High-Strength Steels. A. A. Bibee. *Metal Progress,* v. 63, May 1953, p. 95-96, 167.
Summary of information regarding metallurgy, processing, and design considerations of steels heat treated to above 200,000 psi. Report of SAE meeting during Western Metal Congress, Los Angeles, March 1953. (Q23, AY)

494-Q. Bearing Alloy of Iron-Silicon Brass. *Metal Progress,* v. 63, May 1953, p. 202, 204.
Condensed by N. H. Polakowski from "Iron-Silicon Brass as Substitute for Tin Bronzes and Zinc Alloys", by V. V. Gusvev, *Liteynoe Proizvodstvo,* no. 3, 1952, p. 29-30. Development of an Fe-Si brass which is reported to have antifriction properties equivalent to the tin bronzes. Properties and comparisons of relative cost are given. (Q9, Cu, Fe, Si)

495-Q. How Hard is Hard? Howard E. Boyer. *Modern Machine Shop,* v. 26, June 1953, p. 140-149.
Laboratory concept of hardness

testing for the benefit of shop personnel who are responsible for the inspection of parts and materials. Micrographs. (Q29, S general)

496-Q. Developments in the Analysis of Lugs and Shear Pins. M. A. Melcon and F. M. Hoblit. *Product Engineering*, v. 24, June 1953, p. 160-170.

Method for determining strength of lugs loaded obliquely or transversely. Refined procedure for predicting pin or bolt adequacy in bending failure. Diagrams, graphs. (Q5)

497-Q. Shock or Vibration Isolators? J. Markowitz. *Product Engineering*, v. 24, June 1953, p. 212-214.

Equipment mountings to eliminate service failures from vibration and/or shock. Photographs. (Q9)

498-Q. Charts for Allowable Compressive Stresses in Aluminum and Magnesium Alloys. B. E. Gatewood. *Product Engineering*, v. 24, June 1953, p. 235, 237, 239.

Charts show allowable compressive stresses in both elastic and plastic regions. They are based on a nondimensional compressive stress-strain curve. Graphs. (Q28, Al, Mg)

499-Q. (English.) **Anisotropic Elasticity With Applications to Dislocation Theory.** J. D. Eshelby, W. T. Read, and W. Shockley. *Acta Metallurgica*, v. 1, no. 3, May 1953, p. 251-259.

General theory of anisotropic elasticity for a 3-dimensional state of stress in which the stress is independent of one Cartesian coordinate. General theory is applied to the dislocation of metals. (Q21, M26)

500-Q. (English.) **The Effect of Deformation on the Electrical Resistivity of Some Cobalt-Nickel Alloys.** T. Broom and C. S. Barrett. *Acta Metallurgica*, v. 1, no. 3, May 1953, p. 305-309.

Resistivity determinations on annealed and deformed wires confirmed that stacking faults can make a large direct or indirect contribution to the increase in resistivity due to cold work. X-ray evidence was obtained for presence of stacking faults in the deformed alloy which had the largest increase in resistivity. Graphs. (Q24, P15, Co, Ni)

501-Q. (German.) **Cinematographic Investigations of Slip-Lines on Aluminium Single Crystals.** R. Becker and P. Haasen. *Acta Metallurgica*, v. 1, no. 3, May 1953, p. 325-335.

Cinematographic observations of growth of slip-lines on Al single crystals under constant load. Results in terms of dislocation theory. Graphs, diagrams. (Q24, Al)

502-Q. (English.) **Theory of Initial Stress-Strain Curves in Face-Centered Metals.** J. S. Koehler. *Acta Metallurgica*, v. 1, no. 3, May 1953, p. 377.

Briefly reviews work using Al. (Q25, Al)

503-Q. (German.) **Testing of Structure of Finest Cu Wires in Cross-Section Range of 0.15 to 0.02 MM.** F. Erdmann-Jesnitzer and M. May. *Metall*, v. 7, nos. 7-8, Apr. 1953, p. 250-254.

Texture was examined with special regard for amount of drawing. Photographs, diagrams. 7 ref. (Q24, Cu)

504-Q. (German.) **Occurrence of a Definite Elastic Limit and of Flow Figures for Brass and Nickel-Silver.** R. Ergang and St. Welz. *Metall*, v. 7, nos. 7-8, Apr. 1953, p. 254-256.

β-brass separations in Brass-63 and experimental data concerning definite elastic limit and flow curves. Diagrams. 6 ref. (Q21, Q24, Cu)

505-Q. (German.) **Effects of Working Conditions on Properties of Metallized Coatings of Steel.** Helmut Koch and Joseph Adams. *Schweissen und Schneiden*, v. 5, no. 4, Apr. 1953, p. 131-142.

Shows that composition of metallized wire, temperature, distance of spraying, and fuel-oxygen ratio determine structure and physical properties of metal deposits. Diagrams, photographs, tables, graphs. 12 ref. (Q general, L23, M27, CN)

506-Q. (German.) **New Alloy Structural Steels.** H. Jenny. *Schweizer Archiv für angewandte Wissenschaft und Technik*, v. 18, no. 12, Dec. 1952, p. 405-412.

Properties and composition. Tables, graphs. (Q general, AY)

507-Q. (German.) **Measuring Creep Resistance of Hard Lead Between 25 and 75° c.** Günter Hillen and Wilhelm Hofmann. *Zeitschrift für Metallkunde*, v. 44, no. 4, Apr. 1953, p. 129-130.

Measurement at 25, 50, and 75° C. Tests were made on alloys containing up to 5.4% Sb. Tables. 6 ref. (Q3, Pb, Sb)

508-Q. (German.) **Observations on Vibration Resistance of Homogeneously Lead-Plated Sheet Steel.** Günter Hillen and Wilhelm Hofmann. *Zeitschrift für Metallkunde*, v. 44, no. 4, Apr. 1953, p. 131-132.

Bending-fatigue tests at room temperature and 100° C. Cracks in Pb plating were determined by measuring electrical resistance. Photographs, charts. 2 ref. (Q7, Pb)

509-Q. (German.) **Investigations of a Hard Lead Tube of the Year 1935.** Wilhelm Hofmann and Rosemarie Engel. *Zeitschrift für Metallkunde*, v. 44, no. 4, Apr. 1953, p. 132-133.

Examines Pb tubes with 1.0% Sb which segregated but did not reduce creep resistance significantly. Photomicrographs. 2 ref. (Q3, Pb, Sb)

510-Q. (German.) **Comparison Between Radiographically and Ferromagnetically Determined Internal Stresses.** Ulrich Dehlinger and Herbert Scholl. *Zeitschrift für Metallkunde*, v. 44, no. 4, Apr. 1953, p. 136-138.

Conditions of agreement and disagreement in results. Graphs. 9 ref. (Q25)

511-Q. Graphical Shear and Moment Calculations. William S. Beller. *Aero Digest*, v. 66, June 1953, p. 21-24.

Mathematical justification of new time-saving method which is accurate yet simple. (Q2)

512-Q. How Well Do Girth Weld Sleeves Resist Loading and Bending Stresses? G. B Grable and G. M. McClure. *Gas*, v. 29, June 1953, p. 87-89.

Investigation to determine actual performance of sleeve reinforcements for girth welds under operating conditions in the field. Photographs. (Q25, K general, CN)

513-Q. Tensile and Impact Properties of High-Purity Iron-Carbon and Iron-Carbon-Manganese Alloys of Low Carbon Content. N. P. Allen, W. P. Rees B. E. Hopkins, and H. R. Tipler. *Iron and Steel Institute, Journal*, v. 174, pt. 2, June 1953, p. 108-120.

Tensile and impact properties at various temperatures spanning the tough-to-brittle transition were measured for various heat treatments above and below the Al point. Electron microscope pictures show changes during aging. Graphs, diagrams. 10 ref. (Q23, Q6, CN, AY)

514-Q. Fully Plastic Rotating Disc With Large Strains. Melvin Zaid. *Journal of Aeronautical Sciences*, v. 20, June 1953, p. 369-377.

Finite strain theory was used to investigate stresses, strains, and speeds leading to failure. Concept of a strain plane is introduced. General solutions are obtained for many specific profiles and materials. It is shown that the bursting speed is dependent largely on profile shape. Graphs. 10 ref. (Q25)

515-Q. Analyzing Beam Vibration. George Sonnemann. *Machine Design*, v. 25, June 1953, p. 123-128.

Simplified method for determining the natural frequency of uniform or nonuniform section beams. Diagrams, tables. (Q9)

516-Q. Stresses in Rotating Parts. R. L. Lake and A. J. Durelli. *Machine Design*, v. 25, July 1953, p. 128-131.

"Creep-freezing" technique and use of brittle coating in conjunction with stepwise load application and plastic models. Diagrams. (Q25)

517-Q. Service Experience With Magnesium in Aircraft. Dale H. Black. *Modern Metals*, v. 9, June 1953, p. 52, 54, 56.

Improvements in Mg ductility which increased applications for aircraft components. (Q23, T24, Mg)

518-Q. The Bauschinger Effect in Some Face-Centered and Body-Centered Cubic Metals. R. L. Woolley. *Philosophical Magazine*, v. 44, June 1953, p. 597-618.

Bauschinger effect was studied in Cu, Al, Pb, Ni, and Fe, after deformations between 1 and 120%. Strain associated with the effect is shown to be approximately proportional to the stress applied to produce work hardening, divided by the elastic modulus. Results agree with those of other workers, but disagree with the predictions of existing theories. Possible qualitative explanation of the effect is suggested. Graphs, tables, diagrams. (Q24, Cu, Al, Pb, Ni, Fe)

519-Q. A Low Temperature Bath for Constant Temperature Studies. John Vajda and Donald P. Hart. *Review of Scientific Instruments*, v. 24, May 1953, p. 354-355.

Construction and operation of a low-temperature bath used for impact testing. Diagrams. (Q6)

520-Q. Behavior of Single Crystals and of Pure Metals. R. M. Brick. Paper from Behavior of Metals at Low Temperatures, p. 1-38, 1953. American Society for Metals, 7301 Euclid Ave., Cleveland 3, Ohio.

Mechanical properties and basic related phenomena. Differences between the metals which remain ductile at low temperatures and those which become brittle. Diagrams, graphs. 30 ref. (Q general, Fe, Al, Cu)

521-Q. The Influence of Mechanical Variables. John R. Low, Jr. Paper from Behavior of Metals at Low Temperatures, p. 39-70, 1953. American Society for Metals, 7301 Euclid Ave., Cleveland 3, Ohio.

Normal influence of a decrease in temperature on the strength and ductility of a metal which does not exhibit a change in the mode of fracture. Shows that influence of mechanical variables is qualitatively the same at low temperatures as at ordinary temperatures if there is no change in the mode of fracture. Graphs. 59 ref. (Q23, Q26, Al, Fe, Cu, Ni, ST)

522-Q. Influence of Metallurgical Factors. C. H. Lorig. Paper from Behavior of Metals at Low Temperatures, p. 71-105, 1953. American Society for Metals, 7301 Euclid Ave., Cleveland 3, Ohio.

Reviews factors which influence low-temperature behavior. Graphs. 38 ref. (Q general, Al, Ni, Cu, Pd)

523-Q. Effect of Hydrogen on the Embrittlement of Zirconium and Zir-

conium-Tin Alloys. W. L. Mudge, Jr. Paper from Zirconium and Zirconium Alloys, p. 146-167. 1953. American Society for Metals, 7301 Euclid Ave., Cleveland 3, Ohio.

Investigation to study the effect of heat treatment on the mechanical properties of Zr and Zr-Sn alloys. Notch impact test method was used. Graphs, tables, micrographs. 14 ref. (Q23, Zr, Sn)

524-Q. (Dutch.) **Copper and Copper Alloys. XI. Phosphorus Bronze Alloys.** W. G. R. DeJager. *Metalen*, v. 8, no. 7, Apr. 15, 1953, p. 163-164.

Chemical composition and hardness. (To be continued.) (Q29, Cu)

525-Q. (German.) **Processes in Deformation and Flow of Matter as a Mechanical-Thermodynamic Problem.** J. Pawlowski. *Kolloid Zeitschrift*, v. 131, no. 1, Apr. 1953, p. 11-18.

Natural system and unified description of important rheological processes resulting from mechanical thermodynamic changes. 11 ref. (Q24, P12)

526-Q. (German.) **Bending Property of Zinc Coatings.** H. Bablik, J. Krystof, F. Götzl, and R. Kukaczka. *Metall*, v. 7, nos. 9-10, May 1953, p. 313-319.

Variables affecting production of ductile Zn coatings, adhesion, deformability, temperature, speed of deformation, and stresses are considered. Photographs, diagrams. 2 ref. (Q5, Zn)

527-Q. (German.) **Effect of Pre- and Post-Treatment on Properties of Welded, Basic Bessemer and Open Hearth Steels.** W. Püngel. *Schweissen und Schneiden*, v. 5, no. 2, Feb. 1953, p. 62-66.

Effects of forging, rolling, age hardening, normalizing, and quenching on impact strength. Micrographs, graphs. (Q6, ST)

528-Q. (German.) **Strength Tests on Flame-Cut Specimens of Cr-V Steel.** A. Erker. *Schweissen und Schneiden*, v. 5, no. 5, May 1953, p. 183-189.

Effect of flame cutting on the hardness, structure, tensile, and fatigue strength of unheat treated and subsequently heat treated specimens. Tables, graphs, diagrams. 6 ref. (Q general, G22, Cr)

529-Q. (German.) **Weld Bend Test According to ONORM M 3052.** H. Melhardt. *Schweisstechnik*, v. 7, no. 3, Mar. 1953, p. 29-34.

ONORM M 3052 standards are compared with the I.I.S. Standards (International Institute of Welding Practice Standards) using bend tests on high strength structural steels. Terms are defined and explained. Photographs, diagrams, tables. 6 ref. (Q5, K9, CN)

530-Q. (German.) **Heat Stability of Heat-Resistant Steels Over a Long Period of Time.** H. Holdt. *Schweizer Archiv für angewandte Wissenschaft und Technik*, v. 19, no. 4, Apr. 1953, p. 99-105.

Behavior of various steels shows that predictions of conduct after 100,000 hr. cannot be made after 1000 hr. Brittle fractures and structural changes. Bend stressing. Photographs, graphs, tables. 5 ref. (Q23, SS)

531-Q. (German.) **Effects of Tin and Arsenic on Alloyed Heat Treatable Steels.** Helmuth Krainer. *Stahl und Eisen*, v. 73, no. 2, Jan. 15, 1953, p. 103-104.

V, Cr-V, Cr-Ni-V steels with varying As and Sn contents were tested. Increased Sn caused grain coarsening and lowered impact strengths. Arsenic up to 0.4% had little effect except in the Cr-Ni steel. Tables, graphs. 4 ref. (Q general, Sn, As, AY)

532-Q. Stress State According to C. Bach. Application of Various Hypotheses. K. Wellinger. *Zeitschrift des Vereines deutscher Ingenieure*, v. 95, no. 13, May 1, 1953, p. 377-378.

Tabulates hypotheses on uni-axial stressing to permit evaluation of multi-axial stresses. Tables. (Q25)

533-Q. (German.) **Disturbance of Slipping by Aluminum Crystals.** Hansheinz Lange and Kurt Lücke. *Zeitschrift für Metallkunde*, v. 44, no. 5, May 1953, p. 183-191.

The mechanism of solidification of high-purity Al monocrystals was studied. Tables, diagrams, microphotographs. 34 ref. (Q24, N12, Al)

534-Q. (Book.) **Behavior of Metals at Low Temperatures.** 112 p. 1953. American Society for Metals, 7301 Euclid Ave., Cleveland 3, Ohio. $3.00.

Presents three educational lectures given during the 34th National Metal Congress and Exposition, Philadelphia, Oct. 20-24, 1952. Individual lectures are abstracted separately. (Q general)

R

CORROSION

241-R. Corrosion of Heating Electrodes in Molten Chloride Baths. H. R. Copson. *Electrochemical Society, Journal*, v. 100, June 1953, p. 257-264.

Methods of preventing "pencilling" involving the use of rectifiers, oxidizing agents, and low current density. Graphs, photographs. 4 ref. (R6, Ni, Cr)

242-R. Corrosion. Mars G. Fontana. *Industrial and Engineering Chemistry*, v. 45, June 1953, p. 91A-92A, 94A.

Reviews "Corrosion by Acids at High Temperatures" by R. F. Miller, R. S. Treseder, and A. Wachter; and "Corrosion by Aqueous Solutions at Elevated Temperatures and Pressures" by F. H. Beck and M. G. Fontana. Discusses handling HNO_3 at temperatures above atmospheric boiling point. Effect on stainless steel and Cu. (R5, Cu, SS)

243-R. Corrosion Prevention by Paints. J. E. O. Mayne. *Institute of Metal Finishing, Bulletin*, v. 3, Spring 1953, p. 19-28.

Mechanism by which paint films prevent corrosion of iron and steel. 19 ref. (R10, L26, ST, CI)

244-R. The Elements of Cathodic Protection. K. A. Spencer. *Institute of Petroleum Review*, v. 7, May 1953, p. 149-154.

Causes of corrosion, principle of cathodic protection, equipment, and economy. Diagrams. (R10)

245-R. Corrosion and Its Control. Fred R. Mulker. *Journal of Petroleum Technology*, v. 5, sec. 1, May 1953, p. 30.

Process and ways of combating corrosion. (R general, Ni, SS)

246-R. How to Control Marine Corrosion With Galvanic Anodes. R. D. Taylor. *Marine Engineering*, v. 58, June 1953, p. 69-73.

How Mg anodes can be used effectively to control corrosion. Photographs. (R3, R10, Mg)

247-R. Little Bugs. Big Problems. O. B. Williams. *World Oil*, v. 136, June 1953, p. 170, 172, 175.

Problem of controlling sulfate-reducing bacteria in oil field waters. (R1, CN)

248-R. Some Answers to Oil Field Scale and Corrosion. E. N. Frisius. *World Oil*, v. 136, June 1953, p. 191-192, 194.

Occurrence of scale and corrosion; suggests solutions. (R2, R10)

249-R. (German.) **Corrosion of Aluminum Ware.** Paul Melchoir. *Zeitschrift für Metallkunde*, v. 44, no. 3, Mar. 1953, p. 83-84.

Formation of small black grooves is not due to impurities of Al but to carbonized carbohydrates. Mechanical cleaning is best protection against pitting. Photographs. (R2, L10, Al)

250-R. The Cavitation-Erosion of Ships' Propellers. J. Balhan. *Engineers' Digest*, v. 14, May 1953, p. 163-167, 170.

Translated and condensed from *Ingenieur*, v. 65, no. 6 and 7, Feb. 6 and 13, 1953, p. W29-W40, W41-W45, W52. Three types of cavitation; theoretical considerations. Diagrams. (R2, Cu, CN)

251-R. The Action of Nitric Acid on Metals. Mahadeo M. Tillu. *Journal of Chemical Education*, v. 30, June 1953, p. 290.

Single general equation for these reactions. (R5)

252-R. High Temperature Corrosion in Nickel-Chromium Alloys. Norman Spooner, John M. Thomas, and L. Thomassen. *Journal of Metals*, v. 5, June 1953; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 197, 1953, p. 844.

Investigation of Ni-Cr and Ni-Cr-Fe when used as electrical resistance heating elements in reducing atmospheres. (R1, Ni, Cr)

253-R. New Corrosion Problems Created by High Temperatures and Chemical Processes. John Parina, Jr. *Metal Progress*, v. 63, May 1953, p. 112-114.

Reviews papers presented at the Ninth Annual Conference of the National Association of Corrosion Engineers. Corrosion problems associated with high-temperatures, passive state of Ti and refinery processes. (R general, Ti, SS)

254-R. "Crusader" Checked for Corrosion. *Railway Age*, v. 134, June 22, 1953, p. 17-18.

Corrosion of stainless steel, carbon steel, and Al in railroad cars. (R3, Al, SS, CN)

255-R. (German.) **Basic Principles of Corrosion.** E. Lange. *Schweizer Archiv für angewandte Wissenschaft und Technik*, v. 18, no. 12, Dec. 1952, p. 395-404.

Basic principles, various electrochemical aspects, and energy of a simple corrosion system. (R1)

256-R. (German.) **Corrosion Problems in Fire Engineering.** Ludwig Scheichl. *Werkstoffe und Korrosion*, v. 4, no. 4, Apr. 1953, p. 123-128.

Fire-fighting equipment and appliances and corrosive actions to which they may be subjected. Some anticorrosion measures are suggested. Diagrams. 16 ref. (R general)

257-R. Corrosion Research. W. H. J. Vernon. *Chemical Age*, v. 68, June 6, 1953, p. 853-854.

British research. (R general)

258-R. Corrosion Inhibitors in Neutral Aqueous Solutions. F. Wormwell. *Chemistry & Industry*, June 6, 1953, p. 556-560.

Investigations demonstrated the value of Na benzoate and Na salts of other organic acids as corrosion inhibitors for mild steel. Tables. 47 ref. (R10, CN)

259-R. Bacterial Corrosion of Offshore Structures. J. A. Caldwell and M. L. Lytle. *Corrosion* (Technical Section), v. 9, June 1953, p. 192-196.

Investigation to determine whether it is probable that corrosion of steel occurs at or below the mud line; causes of corrosion, and reducing such corrosion to a reasonable minimum. (R1, ST)

260-R. Studies on the Inhibition by Amines of the Corrosion of Iron by Solutions of High Acidity. C. C. Nathan. *Corrosion* (Technical Section), v. 9, June 1953, p. 199-202.

Studies on the corrosion of steel strips and Fe powder in solutions of 1 N HCl. Studies were directed toward evaluation of various aliphatic and aromatic amines as corrosion inhibitors and to the correlation of the structure of the amines with their adsorption characteristics and inhibitor efficiencies. Graphs. (R10, Fe, ST)

261-R. Graphical Multiple Correlation of Corrosion Data. O. B. Ellis. *Corrosion* (Technical Section), v. 9, June 1953, p. 203-208.

Graphical method for a multiple correlation analysis involving several variables. Weight loss data from atmospheric exposure of low-alloy steels. Method is described and the effect of concentration of Ni, Mn, P, and Si on weight loss is shown. Graphs. (R3, S12, AY)

262-R. How Montana Power Uses Cathodic Protection for 95 Per Cent of Distribution Mains. Carl R. Davis. *Gas Age*, v. 111, June 4, 1953, p. 32-34, 73-74.

Experiences since 1936. Diagrams. (R10)

263-R. Nickel-Clad Molybdenum. J. Lomas. *Machinery* (London), v. 82, May 22, 1953, p. 965.

Shows that up to 1100° C. clad Mo sheets give superior all-round service to unclad Mo, combining high strength with resistance to oxidation. Edge protection for work at high temperatures offers no difficulty. Mechanical properties. (R2, L22, Q general, Mo, Ni)

264-R. Sensitive Corrosion Measurements With an Interferometer. *National Bureau of Standards, Technical News Bulletin*, v. 37, June 1953, p. 88-90.

Interferometer procedure used for studies of the corrosion resistance of such materials as optical glass, porcelain enamel, quartz and other natural and artificial silicates, and various metals. (R11)

265-R. Stray-Current Corrosion. *Oil and Gas Journal*, v. 52, June 15, 1953, p. 151.

Typical example of stray currents and resulting corrosion. (R1)

266-R. South Louisiana Operators Wage Fight on Four Types of Corrosion. Jack T. Martin. *Oil and Gas Journal*, v. 52, June 22, 1953, p. 308-314, 316, 318, 320.

Water independent, water dependent, H_2S, and galvanic corrosion. Tables. (R general)

267-R. Corrosion Problems, New Processes Mark Refiners' Meet. Arch L. Foster. *Petroleum Engineer*, v. 25, June 1953, p. C39-C42.

"Autofiner" process, economics of "Houdriforming," TCP process, corrosion inhibitor, and H_2 attack on steel. (R general, ST)

268-R. In Corrosion Testing Get the Facts. Allen G. Gray. *Steel*, v. 132, June 15, 1953, p. 128, 130-131, 133.

Important variables and typical results for Ni alloys. (R11, Ni)

269-R. Corrosion Resistance of Titanium and Its Allovs. F. L. LaQue. Symposia on Materials and Design for Lightweight Construction. The Titanium Seminar. Aug. 6, 1951, p. 55-68; P.B. Report No. 111,083, U. S. Dept. of Commerce, OTS, Washington 25, D. C.

Resistance of Ti to many environments. Tables, graphs, photographs. 24 ref. (R general, Ti)

270-R. The Corrosion Resistance of Zirconium and Its Alloys. Lex B. Golden. Paper from Zirconium and Zirconium Alloys, p. 305-326. 1953. American Society for Metals, 7301 Euclid Ave., Cleveland 3, Ohio.

Results obtained with Zr exposed to the corrosive action of various concentrations of inorganic acids and salts, and organic acids. Relative corrosion resistance of arc-melted and induction-melted Zr and Zr alloys. Photographs, tables. 18 ref. (R general, Zr)

271-R. (French.) General Outline on the Electrochemical Behavior of Metals. I. Marcel Pourbaix. *Ossature Metallique*, v. 18, Jan. 1953, p. 47-56.

Corrosion phenomena in the presence of H_2O and aqueous solutions. Part I emphasizes influence of pH, electrochemical equilibria, and electrode voltage. Tables, charts. (To be continued.) (R1, Ag, Cu, Al)

272-R. (French.) The Phenomena of Passivation of Aluminum Immersed in a Nitric Medium. Jos. Patrie. *Revue de l'Aluminium*, v. 29, Dec. 1952, p. 431-437; v. 30, Jan. 1953, p. 5-11; v. 30, Feb. 1953, p. 45-54.

Part I: Passivation of Al immersed in acidic oxidizing solutions frequently involves complex reactions which are difficult to identify. A theoretical Al-H_2O diagram taking into account pH and potential coordinates is presented. Part II: Use of noninsulated Al and galvanic oxidation process in concentrated HNO_3. Part III: Galvanic oxidation of Al in HNO_3 and H_2CrO_4. Oxidation time, current density, temperature, and nature of the electrolyte are included. (To be continued.) (R10, Al)

273-R. (German.) Behavior of Aluminum Toward Hydrofluoric Acid, Phosphoric Acid, Chromic Acid, and Their Mixtures. W. Wiederholt. *Metall*, v. 7, nos. 9-10, May 1953, p. 343-347.

Points out absence of layer formation and conditions that lead to such formation. Graphs, tables. 3 ref. (R5, Al)

274-R. (German.) Stress Cracks Produced in Steel by Molten Zinc. Wilhelm Rädeker. *Stahl und Eisen*, v. 73, no. 10, May 7, 1953, p. 654-658.

Deteriorating effect of molten metals on structure and properties of steel. Behavior of various steel grades are emphasized. Photographs, graphs, tables. 3 ref. (R6, Q general, Zn, ST)

275-R. (German.) Attack of Iron by Iron-Saturated Zinc Melts. Dietrich Horstmann. *Stahl und Eisen*, v. 73, no. 10, May 7, 1953, p. 659-665.

Relationship of temperature and time of attack of Zn on Fe. This was done by determining Fe loss and growth of Fe-Zn alloy layers caused by dipping Fe in molten Zn. Photographs, graphs, diagrams, tables. 17 ref. (R6, Fe, Zn)

276-R. (German.) The Corrosion Resistance of Fusion Welding on Steels. Ernst Klosse. *Werkstoffe und Korrosion*, v. 4, no. 5, May 1953, p. 172-178.

Small test specimens give no satisfactory results since corrosion resistance depends on material, welding technique, design of the weld joint, mechanical stress, and corrosive agent. Diagrams, photographs, photomicrographs. 19 ref. (R11, K general, ST)

277-R. (German.) Use of Al in Hot-Spraying Process. Harribald Sprenger. *Zeitschrift für Metallkunde*, v. 44, no. 5, May 1953, p. 219-223.

Corrosion resistant properties. Tables, photographs. 8 ref. (R general, L23, Al)

S INSPECTION AND CONTROL

203-S. Tin Assay Shortcut Speeds Control. C. Goldberg. *Iron Age*, v. 171, May 28, 1953, p. 130-131.

A faster method for determining tin content in brasses and bronzes for control work. (S11, Cu, Sn)

204-S. The Magnetic Amplifier and Its Application in the Steel Industry. W. E. Miller. *Iron and Steel Engineer*, v. 30, May 1953, p. 65-75; discr., p. 75-79.

Principles of operation and application of this form of regulating equipment. Future possibilities. Diagrams, photographs. (S18, D general)

205-S. Gravimetric Determination of Sulphur in Basic Steelmaking Slags. *Iron and Steel Institute, Journal*, v. 174, pt. 1, May 1953, p. 28-30.

Development of a standard procedure. Tables. (S11, B18, ST)

206-S. Ultrasonic Equipment for High-Precision Thickness Measurement. Peter K. Bloch. *Nondestructive Testing*, v. 11, May 1953, p. 21-23.

Refinements in equipment and technique which have made it possible to obtain thickness measurements within ½% of actual dimensions with ultrasonic resonance instruments. (S14)

207-S. Industrial Evaluation of Search Coil Flaw Detection Techniques. C. H. Hastings and G. A. Darcy. *Nondestructive Testing*, v. 11, May 1953, p. 24-29.

Basic techniques and additional experience in the use of a search coil technique for magnetic flaw detection. Photographs, diagrams. (S13)

208-S. Industrial Application of Eddy Current Testing. William A. Cannon, Jr. *Nondestructive Testing*, v. 11, May 1953, p. 30-33.

Equipment and conditions under which it is used. Photographs. (S13, P16)

209-S. Optical Gaging for Economical Inspection of Sinterings. *Precision Metal Molding*, v. 11, Apr. 1953, p. 51-52.

Technique compared with mechanical gaging. (S14)

210-S. Control of Metallurgical Standards. W. J. Harris, Jr. *Standardization*, v. 24, May 1953, p. 132-136.

Need for integrating and standardizing research findings. Photographs. (S22)

211-S. One Bad Weld Paid Cost of Inspection. Leslie S. Fletcher. *Welding Engineer*, v. 38, June 1953, p. 50-52.

Facilities for inspecting pipes for underwater use. Economy is emphasized. Photographs. (S13, K9, CN)

212-S. (French.) Applied Radioactivity. A Technique of Determining Tantalum in Ferroniobium and Niobium Ores. Andre Kohn. *Comptes Rendus hebdomadaires des Séances de l'Académie des Sciences*, v. 236, no. 14, Apr. 8, 1953, p. 1419-1421.

Method of analyzing Ta with no chemical separation of above. Activity of samples and standards is compared after irradiation in a slow neutron flux. Ta content may be determined within 5%. 2 ref. (S19, S10, Ta, Cb)

213-S. (French.) Commission for the Study of Metallic Construction (C.E.C.M.). Francois Perot. *Ossature Metallique*, v. 18, no. 4, Apr. 1953, p. 231-242.

A joint committee sponsored by the "Federation de l'Industrie des

Fabrications Metalliques", the "Groupement de Hauts Fourneaux et Acieries Belges", and the "Groupement des Industries Sideurgiques Luxembourgeoises". Summarizes work done on the classification and standardization of Belgian structural steels. Diagrams. (S22, ST)

214-S. (German.) **A Simple Process for Detremining Thickness of Sn Coat on Pb Sheet.** Gerhard Schikorr. *Metalloberfläche*, v. 7, ser. B, no. 1, Jan. 1953, p. B8-B9.

Use of $(NH_4)_2S$. Process is applicable to tin plate. (S14, Sn, Pb, CN)

215-S. New Limit System Proposed for Metalworking. F. W. M. Lee. *American Machinist*, v. 97, June 8, 1953, p. 137-141.

Standardization of limits into an easily memorized unilateral system saves gaging costs. (S14)

216-S. Techniques of Temperature Control. S. D. Ross. *Consulting Engineer*, v. 2, May 1953, p. 42-45.

Sensing devices, control in open and closed vessels, limit control, and program control. Diagrams. (S16)

217-S. Neutron Detectors for Reactor Instrumentation. T. A. J. Jaques, H. A. Ballinger, and F. Wade. *Institution of Electrical Engineers, Proceedings*, v. 100, pt. I, May 1953, p. 110-116; disc., p. 116-120.

Principles involved in the detection of thermal neutrons. Describes three types of detector used in the operation of natural-uranium graphite-moderated reactors. Tables, diagrams. 7 ref. (S19, U)

218-S. Sampling and Testing Titanium. Robert B. Stanton. *Modern Machine Shop*, v. 26, June 1953, p. 136-138.

Practical receiving inspection and sampling procedure developed for Ti bars, sheets, and strips. (S12, Ti)

219-S. Gaging Broaches by Optical Projection. B. G. Lawrence. *Modern Machine Shop*, v. 26, June 1953, p. 196-198.

Shows that optical gaging now makes possible the checking of all teeth of broaches for tooth form, spacing, and wear for the entire length of a broach. Photographs. (S14)

220-S. Phase and Intensity Measurements for Some Aluminum Films. Kozo Ishiguro and Goro Kuwabara. *Optical Society of America, Journal*, v. 43, May 1953, p. 365-367.

Made with a modified "Rayleigh Lowe Interferometer". (S15, Al)

221-S. How to Cut Weld Inspection Time. Alexander Gobus. *Petroleum Engineer*, v. 25, June 1953, p. C21, C24.

New inspection method permits radiography of hot welds without cooling and reheating cycles. Diagrams. (S13, K9)

222-S. Transmission of Co^{60} Gamma Rays Through Thick Uranium. L. H. Lanzl, L. S. Skaggs, J. H. Pingel, and J. E. Rose. *Review of Scientific Instruments*, v. 24, May 1953, p. 394.

Measurements. (S19, Co)

223-S. Increased Sensitivity of Leak Detection With Hydrogen. George A. Alers, James A. Jacobs, and Philip R. Malmberg. *Review of Scientific Instruments*, v. 24, May 1953, p. 399-400.

Techniques. (S13)

224-S. Behavior of Two Types of Thermocouples Under Pile Irradiation at Low Temperatures. R. E. Jamison and T. H. Blewitt. *Review of Scientific Instruments*, v. 24, June 1953, p. 474.

Account of tests made at Oak Ridge. (S16)

225-S. (German.) **Quick Analysis of Steels, Aluminum, and Copper Alloys With Metal Spectroscope.** K. D. Mielenz. *Metall*, v. 7, nos. 7-8, Apr. 1953, p. 256-260.

Evaluation of above process and compares it with other methods. Early development and basis of spectral analysis. (S11, Fe, Al, Cu)

226-S. (German.) **Testing Rail Welds by Ultrasonics.** W. Lehfeldt. *Schweissen und Schneiden*, v. 5, no. 3, Mar. 1953, p. 110-112.

Principles and methods of using such test instruments. Photographs, diagrams. (S13)

227-S. (German.) **Development of Weighing Apparatus for Iron and Steel Industry.** Kurt Rosenbaum. *Stahl und Eisen*, v. 73, no. 9, Apr. 23, 1953, p. 573-574.

New devices and their costs. Emphasizes methods for speeding up weighing procedures. Photographs. (S12)

228-S. (German.) **Frequency Determinations on Analytical Deviations of Turnings and Remelted Pigs of AlCuMg.** August Buckeley. *Zeitschrift für Erzbergbau und Metallhüttenwesen*, v. 6, no. 3, Mar. 1953, p. 87-91.

Deviations from research results were noted from frequency curves set up after double analysis. Most deviations are due to differences in sampling and analyzing. (S12, Al, Cu, Mg)

229-S. Profile-Projector. *Aircraft Production*, v. 15, June 1953, p. 222-223.

Instrument used to inspect turbine blades and die profiles. Diagram, photograph. (S14)

230-S. Castings and Ultrasonic Testing. *Foundry Trade Journal*, v. 94, May 28, 1953, p. 611-612.

Application to testing, difficulties with castings, and apparatus. (S13, CI)

231-S. Micro-Inch Inspection in the Timken Gage Laboratory. Michael C. Curtis. *Machinery* (American), v. 59, June 1953, p. 180-186.

Surface inspection equipment. Illustrations. (S14)

232-S. Weight of Blue-Tempered Spring Steels, Per Lineal Foot. Alfred L. Snape, compiler. *Machinery* (American), v. 59, June 1953, p. 259.

Tabulated data. (S22, ST)

233-S. Statistical Aspects of Specifications. H. H. Johnson. *Mechanical Engineering*, v. 75, June 1953, p. 447-450.

Application of control charts to any dimensional control of forgings or castings. Affords a factual picture of process performance and capability. Information as to the justification for specification tolerances. Graphs. (S22, S12)

234-S. Tolerances and Specifications for Aluminum and Magnesium Castings. W. D. Stewart. *Mechanical Engineering*, v. 75, June 1953, p. 450-455.

Problem of establishing a sequence of solidification so that the change in unit volume on solidification can be compensated for satisfactorily. Permanent mold and sand casting processes. Diagrams, tables. 6 ref. (S22, E general, Al, Mg)

235-S. Tolerances and Specifications for Precision Investment Castings. W. O. Sweeny. *Mechanical Engineering*, v. 75, June 1953, p. 456-457, 471.

Problems and commercial limitations of precision casting process. How tolerances affect cost. Diagrams. (S22, E15)

236-S. A Recent Development in Measuring Flame Hardening Temperatures. *Metal Treating*, v. 4, May-June 1953, p. 8-9, 34.

Describes the "Milliscope" which measures radiation in the infrared range. Photographs. (S19, J2)

237-S. Specification for Ductile Iron. George Sorkin. *Steel*, v. 132, sec. 1, June 22, 1953, p. 86-87.

Bureau of Ships specification that requires low-phosphorus raw materials and a ferritizing anneal to give material with highest uniformity. (S22, J23, CI)

238-S. Production Testing Goes for a Spin. George W. Ehrsam, Jr. *Steel*, v. 132, June 15, 1953, p. 92-94.

Advantages of spin testing before machining. Photographs. (S21)

239-S. Instrumentation Assures Accurate Heat Treating. A. W. Boecker. *Steel Processing*, v. 39, June 1953, p. 277-278, 302-303.

Specialized equipment and techniques used for annealing, hardening, nitriding, stress relieving, and carburizing. Photographs. (S16, S18, J general)

240-S. Determination of Hydrogen in Zirconium by the Hot Vacuum Extraction Method. R. K. McGeary. Paper from Zirconium and Zirconium Alloys, p. 168-175. 1953. American Society for Metals, 7301 Euclid Ave., Cleveland 3, Ohio.

Glass vacuum apparatus used for rapid and precise H_2 determinations. Tables. (S11, Zr)

241-S. (French.) **Modern Methods of Controlling the Quality of Light Alloys Before Use.** E. G. Laffly. *Métallurgie*, v. 85, no. 3, Mar. 1953, p. 199, 201-203.

Degassing and spectrographic analysis as tools for controlling casting quality. (S11, E general)

242-S. (German.) **Testing of Forged Machine Parts.** R. Schinn. *Brennstoff-Wärme-Kraft*, v. 5, no. 4, Apr. 1953, p. 132.

Testing with ultrasonic frequencies and the betatron. DVM rapid test for heat resistance was found unreliable. 10 ref. (S13)

243-S. (German.) **Nondestructive Materials Testing in Boiler Systems.** W. Kolb. *Brennstoff-Wärme-Kraft*, v. 5, no. 4, Apr. 1953, p. 133.

Recent developments. (S general)

244-S. (German.) **Temperature Measurement in High-Temperature Furnaces.** K. Guthmann. *Chemie-Ingenieur-Technik*, v. 25, no. 4, Apr. 4, 1953, p. 169-176.

Measuring techniques, standardization completed thus far, and magnitude of errors of various methods. Methods and equipment are discussed in relation to range of applications. Graphs, diagrams. 8 ref. (S16)

245-S. (German.) **Nondestructive Thickness Measurement for Nonmetallic and Metallic Surface Layers.** F. Forster. *Metall*, v. 7, nos. 9-10, May 1953, p. 320-324.

Measurement of nonconducting layers of nonferrous metals and unmagnetizable steels; thickness of nonferrous surface layers and base metals; precision layer measurements; measuring of Ni layers. Photographs, graphs, diagrams. 3 ref. (S14, Ni)

246-S. (German.) **Testing and Controlling the Working Surfaces of Hollow Tools, Especially of Reducing Dies for the Production of Screws and of Drawing Dies Made of Sintered-Carbide Alloys.** Werner Lueg. *Stahl und Eisen*, v. 73, no. 10, May 7, 1953, p. 621-629.

Procedure and results of tests. Spherical mirrors made inner walls accessible for perpendicular viewing. Photographs, diagrams. 24 ref. (S15, C)

247-S. (German.) **Design and Applications of Betatron Apparatus.** Otto Vaupel. *Stahl und Eisen*, v. 73, no. 11, May 21, 1953, p. 705-721.

Model with stepped-up radiation

yield and radiation tests of welds with greater thicknesses. Photographs, graphs, diagrams. 27 ref. (S13)

248-S. (German.) Devices for Testing and Calibrating Flow Meters. *Zeitschrift des Vereines deutscher Ingenieure,* v. 95, no. 13, May 1, 1953, p. 386-387.

Arrangements for testing and calibrating flow meters under various conditions. Graphs, diagrams, photographs. 6 ref. (S18)

249-S. (German.) New Methods for Studying Material Balance in a Nonferrous Metal Plant Explained by Using Examples From the Duisburger Copper Mine. Wilhelm Teworte. *Zeitschrift für Erzbergbau und Metallhüttenwesen,* v. 6, no. 5, May 1953, p. 161-167.

Periodic control of products composition in a mining and smelting plant is shown to be desirable. Procedures of sampling, quantitative measurement, and analysis. Charts, photographs, diagrams, graphs. (S12)

250-S. (German.) Supersonic Material Testing of Light Metal Semifinished Industrial Products. Josef Krautkrämer and Walter Roth. *Zeitschrift für Metallkunde,* v. 44, no. 5, May 1953, p. 198-205.

Practical application of supersonic test method on press and rolling blooms. Diagrams. 5 ref. (S13)

251-S. (Book.) Applied Inorganic Analysis. 2nd Edition. W. F. Hillebrand, G. E. Lundell, H. A. Bright, and J. L. Hoffman. 987 p. 1953. John Wiley and Sons, Inc., 440 Fourth Ave., New York 16, N. Y. $15.00.

Emphasizes the separation and determination of metals and the treatment of minerals and rocks. (S11, C28, B14)

252-S. (Book.) Mechanical Inspection. W. H. Armstrong. 361 p. McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York 36, N. Y. $5.50.

Purpose is to aid in training of inexperienced men and women as inspectors in machine shops or related industries. Presented simply, it is meant primarily for use in classwork at technical institutes, vocational industrial schools, or industrial training classes. Contains sufficient detail to permit its use in self-instruction. (S general)

T

APPLICATIONS OF METALS IN EQUIPMENT

165-T. Frank Lloyd Wright's Concrete and Copper Skyscraper on the Prairie for H. C. Price Co. *Architectural Forum,* v. 98, May 1953, p. 98-105.

Skyscraper which incorporates Cu, glass, and masonry into its design. (T26, Cu)

166-T. Bucky Fuller Finds a Client. *Architectural Forum,* v. 98, May 1953, p. 108-111.

A geodesic dome constructed from Al and plastic. Illustrated. (T26, Al)

167-T. Nodular Iron, Plywood, and Hot Dip Coating Make Better Fans. Sidney H. Fedan. *Materials & Methods,* v. 37, June 1953, p. 106-109.

Materials are combined to meet the rigid requirements imposed on industrial cooling fans. Photographs. (T27, Fe)

168-T. New Vinyl Core in Steel Cable. *Modern Plastics,* v. 30, June 1953, p. 86-87.

Use and manufacture of resilient and chemical resistant vinyl cores in steel cables. Photographs. (T7, ST)

169-T. An Evaluation of Molybdenum Borides as Cutting Tools. Ira Binder and Arnold Roth. *Powder Metallurgy Bulletin,* v. 6, May 1953, p. 154-162.

Investigation of combinations of Mo_2B with newly discovered Mo_2NiB_2. Graphs. 9 ref. (T6, SG-j)

170-T. Architectural Hardware. New Use for Aluminum and Stainless Steel Investment Castings. H. A. Hietzmann. *Precision Metal Molding,* v. 11, May 1953, p. 28-29.

Description. (T6, E15, Al, SS)

171-T. Production of Cast Aluminum Molds for Forming Foam Rubber Products. Robert F. Dalton. *Rubber Age,* v. 73, May 1953, p. 211-212.

Making the mold and pouring the metal. (T29, E19, Al)

172-T. Light Alloy Bodywork. *Automobile Engineer,* v. 43, May 1953, p. 200-204.

Review of mass production practices in France. Use of Al in automobile bodywork, alloy composition, choice of alloy, and deep drawing techniques. Photographs. (T21, G4, Al)

173-T. Aluminum in Electrical Construction. R. R. Cope. *Consulting Engineer,* v. 2, May 1953, p. 34-37.

Uses of Al as a conductor and as a structural material. (T1, Al)

174-T. Open Hearth Screw Steels Replacing Bessemer. S. Feigenbaum. *Journal of Metals,* v. 5, June 1953, p. 796.

Production of free machining steels in the basic openhearth for automatic screw machine use. (T5, D2, CN)

175-T. How to Select the Proper Steel for Long, Productive Die Life. Stewart G. Fletcher. *Machine and Tool Blue Book,* v. 49, June 1953, p. 214-215, 218-220, 222, 224, 226, 228, 230, 232, 234-243.

Various types of steels and factors in selecting proper die steel for the job at hand. Photographs, tables. (T5, TS)

176-T. The Metal Zirconium and Its Place in Nuclear Power Plants. Edward C. Miller. *Metal Progress,* v. 63, May 1953, p. 67-74.

Problems in the development of atomic power from nuclear fission, particularly as to the nuclear, chemical, and mechanical requirements of the potential structural materials such as Zr. Review of some of the pioneering activities in the Zr program. Tables. (T25, Zr, U)

177-T. New Engineering Materials. *Product Engineering,* v. 24, June 1953, p. 139-145.

Use of powder metals, castings, tubing, Ti, ultra-thin metals, rubber, laminated plastics, technical ceramics, low-alloy permanent magnet materials, high-strength steels, rigid PVC, fluorocarbons, Al, silicones, large moldings, Zr, and composite metals. Photographs, tables. (T general, Zr, Ti, ST)

178-T. New Materials and Methods for Aircraft Construction. H. J. Pollard. *Royal Aeronautical Society, Journal,* v. 57, May 1953, p. 277-293; disc., p. 293-300.

Use of asbestos fibers and plastic; glass and cellulose fiber plastics; resins; Al and Mg alloys; and Ti. Photographs. 30 ref. (T24, Al, Mg, Ti)

179-T. (French.) Interest in High-Strength Steels in the Construction of Rolling Stock. H. Herbiet and C. Scailteur. *Ossature Metallique,* v. 18, no. 3, Mar. 1953, p. 170-177.

Principal applications and possible uses in railroad cars. Composition and mechanical properties of Belgian steel are compared with "Cor-Ten". Tables. (T23, ST)

180-T. (German.) Use of Aluminum in a Degreasing Plant for Semi-Finished Light Metal Extrusions. O. Weiler. *Aluminium,* v. 28, no. 12, Dec. 1952, p. 441-442.

Construction. Advantages of Al for use with ethylene perchlorate. (T29, Al)

181-T. (German.) Base Metals in Electrotechnique. I. Influence of Metallurgical Investigation on Newest Development of Superpower Production and Transmission. A. Schwarz. *Metall,* v. 7, nos. 7-8, Apr. 1953, p. 268-271.

Cu and Al conductors. Tables. 32 ref. (T1, Al, Cu)

182-T. (German.) Precision Mechanics and Optics—A Typical German Industry. *Metall,* v. 7, nos. 7-8, Apr. 1953, p. 279-284.

General discussion on photography and moving pictures. Emphasizes use of brass in equipment. Photographs. (T9, Cu)

183-T. (German.) Lead in the Design of Modern Apparatus. Hans H. Hörger. *Zeitschrift für Metallkunde,* v. 44, no. 4, Apr. 1953, p. 117-122.

Use of Pb and its alloys for anticorrosive parts, coatings, platings, or linings of modern eqpiument. Photographs. (T29, R general, Pb)

184-T. Liquid-Metal-Cooled Power Reactor Looks Promising. *Electrical World,* v. 139, June 15, 1953, p. 114-118.

Report on water-cooled thermal converter and liquid-metal-cooled fast breeder reactors. Design, operating, and cost data. Diagrams, tables. (T25)

185-T. Transitors. New Use for Antimony? *Engineering and Mining Journal,* v. 154, June 1953, p. 99.

Possibility of using Al-Sb instead of Ge in transistors. (T1, Al, Sb, Ge)

186-T. Liquid-Metal Heat-Transfer System for Nuclear Power Plants. Thomas Trocki and D. B. Nelson. *Mechanical Engineering,* v. 75, June 1953, p. 472-476.

Test system designed, constructed and operated to demonstrate practicability of using Na and K for power-plant-scale heat transfer and steam generation. Diagrams. (T25, Na, K)

187-T. Industry Points Way to Nuclear Power. *Mechanical Engineering,* v. 75, June 1953, p. 481-485.

Different approaches to practicable nuclear-power plants of central-station size by four industry teams. Diagrams, tables. (T25)

188-T. Low-Cost Transportation With Aluminum Trolley Coaches. *Modern Metals,* v. 9, June 1953, p. 36, 38.

Advantages of using Al in electric buses. (T21, Al)

189-T. For the U. S. Navy: Lightweight Aluminum Diesels. *Modern Metals,* v. 9, June 1953, p. 68-70.

Efficiency resulting from use of Al throughout the engine structure. (T22, Al)

190-T. Fabricating Titanium for Airframes. F. Robert Kostoch. *Modern Metals,* v. 9, June 1953, p. 72, 74-76.

Reasons for use. Considers buckling, stretch forming, joining, and temperature problems. Photographs. (T24, Q28, G9, K general, S16, Ti)

191-T. Custom-Made Aluminum Roof. Roliton Rolls-It-On! F. L. Church. *Modern Metals,* v. 9, June 1953, p. 78-80; 82-83.

Advantages and profits from use of Al roofs. Photographs. (T26, Al)

192-T. LTF's Copper-Aluminum Bi-Metal Plates. Making Them From

Negatives. *National Lithographer,* v. 60, June 1953, p. 54-55.
Procedure for making.
(T9, Cu, Al)

193-T. Side and End Sheets Last 19 Years. *Railway Age,* v. 134, June 15, 1953, p. 116-117.
Data on construction and service of hopper cars after 19 years.
(T23, AY)

194-T. Die Steels for Cold Extrusion. E. Johnson and E. Bishop. *Sheet Metal Industries,* v. 30, June 1953, p. 490-499.
Quality, heat treatment, hardness, hardenability, resistance to tempering, toughness, abrasion resistance, and ease of machining and grinding. Tables, graphs. (T5, G5, TS)

195-T. High Speed Manufacture of Steel Drums. Alan Heathcote. *Welding and Metal Fabrication,* v. 21, June 1953, p. 197-200.
Fabrication of mild steel. Photographs. (T29, CN)

196-T. (French and German.) **Calculation and Design for Radiant Heating With Copper Tubing.** A. Kollmar. *Pro-Metal,* v. 6, no. 32, Mar. 1953, p. 148-156.
Calorific emissions of heating surfaces and some technical remarks about installation. Diagrams, tables. (To be continued.) (T27, Cu)

197-T. (German.) **Bimetallic Casting for Lead-Bronze Sleeve Bearings.** H. Mann. *Giesserei,* v. 40, no. 11, May 28, 1953, p. 277-290.
Various processes for production of new kind of sleeve bearing which can withstand greater loads. Photographs, diagrams. 18 ref.
(T7, E general, Pb)

198-T. (German.) **The Automobile Industry as a User of Metals.** H. H. Hansen. *Metall,* v. 7, nos. 9-10, May 1953, p. 366-368.
Use of metals and their supply. Graphs. (T21)

199-T. (German.) **Technology of Materials for Electrical Contacts.** Albert Keil. *Zeitschrift für Metallkunde,* v. 44, no. 4, Apr. 1953, p. 166-170.
Selection, shaping, and application of materials. Photographs. 9 ref.
(T1, Ag, Cu, Pd, W, CN)

200-T. (German and French.) **Steel Frame for the New Jelmoli Building in Zürich-Oerlikon.** *Zeitschrift für Schweisstechnik; Journal de la Soudure,* v. 43, no. 5, May 1953, p. 85-88.
Structural-steel parts are illustrated. (T26, ST)

201-T. (Hungarian.) **Electrical Contacts.** Ferenc Bartfai. *Magyar Hiradastechnika,* v. 3, no. 7-9, July-Sept. 1952, p. 117-120.
Shape of contacts. Emphasizes properties of various metals, such as Au, Ag, Pt, Pd, Ir, Rh, Ru, and their alloys, with special regard to their application in relays.
(T1, Au, Ag, Pt, Pd, Ir, Rh, Ru)

V

MATERIALS
General Coverage of Specific Materials

64-V. Germanium. L. Sanderson. *Canadian Mining Journal,* v. 74, May 1953, p. 81-82.
Occurrence, extraction, physical properties, recovery from flue dusts, reduction with C and use in electronics. (Ge)

65-V. Precipitation Hardening Stainless Steels. M. E. Carruthers. *Electrical Manufacturing,* v. 51, June 1953, p. 132-136.
Investigations using ferritic Cr stainless steels containing Cu; 18 to 65% Cr, 2 to 35% Ni steels; 18% Cr, 8% Ni steels modified with Ti, Be, B, or P; and Cr-Ni steels that were marginal as to whether their microstructures were austenitic or martensitic. Study included compositions, and mechanical, high-temperature, physical, and welding properties. Tables.
(M27, N7, Q general, P general, K general, SS)

66-V. New High Purity Aluminum Alloys. *Materials & Methods,* v. 37, June 1953, p. 110-111.
Properties, fabrication, and applications of "Lurium". Table, photographs. (Al)

67-V. Titanium, Molybdenum, Zirconium, and Hafnium. *Materials & Methods,* v. 37, June 1953, p. 125.
Data sheet gives physical, mechanical, and fabricating properties; thermal treatment, corrosion resistance, available forms, and uses. Table.
(Ti, Mo, Zr, Hf)

68-V. Tungsten, Tantalum, Columbium, and Vanadium. *Materials & Methods,* v. 37, June 1953, p. 127.
Data sheet gives physical, mechanical, and fabricating properties; thermal treatment, corrosion resistance, available forms, and uses. Table.
(W, Ta, Cb, V)

69-V. Titanium. The New Light Metal. Rolt Hammond. *Machinery Lloyd* (Overseas Ed.), v. 25, May 23, 1953, p. 69, 71, 73-78.
Occurrence, history of development, structure, properties, and application. (Ti)

70-V. The Metallurgy of Zirconium. E. T. Hayes and W. W. Stephens. *Metal Progress,* v. 63, May 1953, p. 97-110.
General description of the production, properties, and uses of Zr. Tables, photographs. (Zr)

71-V. 17% Chromium Stainless Steel. *Machine Design,* v. 25, June 1953, p. 118-122.
Shows that the above is an effective replacement for Ni-bearing stainless steel. Corrosion resistance, mechanical properties, performance at low and high temperatures, magnetic properties, weldability, weld design, brazing, soldering, stamping, drawing, forming, spinning, machining, and surface finish. Photographs, tables. (SS)

72-V. The Cast Iron That Bends. Richard Sneddon. *Petroleum Engineer,* v. 25, June 1953, p. E5-E6.
Structure, mechanical and physical properties, and uses of ductile cast iron in petroleum industry.
(T29, M27, Q general, P general, CI)

73-V. Titanium—Today and Tomorrow. I. Today. II. Tomorrow. *SAE Journal,* v. 61, May 1953, p. 20-24; June 1953, p. 56-65.
Information from "The Bases for Tonnage Titanium Production", C. I. Bradford; "Titanium Alloys for Aircraft Engine Forgings", L. R. Frazier; "Titanium Alloy Development," M. Hansen and H. D. Kessler; "Titanium in Airframes", F. R. Kostock; and "Utilization of Titanium and Other Alloys in Corrosive Environments", W. L. Williams. Photographs, diagrams.
(C general, F general, T24, R general, Ti)

74-V. Hastelloy Alloy F. A New Corrosion-Resistant Alloy for Lined Digesters. Merril A. Scheil. *Tappi,* v. 36, June 1953, p. 241-247.
Corrosion resistance; mechanical and physical properties; applications; welding characteristics; and fabrication experience. Photographs. (Ni)

75-V. Production Properties and Uses of High Purity Titanium. E. A. Anderson. Symposia on Materials and Design for Lightweight Construction. The Titanium Seminar. Aug. 6, 1951, p. 17-32; P. B. Report No. 111,083, U. S. Dept. of Commerce, OTS, Washington 25, D. C.
A progress report presenting data on physical and mechanical properties of Ti. Graphs, tables, photographs. 14 ref.
(C general, P general, Q general, T general, Ti)

76-V. Physical and Mechanical Properties of Commercial Titanium and Its Alloys. W. L. Finlay. Symposia on Materials and Design for Lightweight Construction. The Titanium Seminar. Aug. 6, 1951, p. 33-54; P.B. Report No. 111,083, U. S. Dept. of Commerce, OTS, Washington 25, D. C.
Development, properties, fabrication, and uses of Ti. Photographs, tables, graphs.
(P general, Q general, T general, Ti)

77-V. Applications and Potential Uses for Titanium and Its Alloys. N. E. Promisel. Symposia on Materials and Design for Lightweight Construction. The Titanium Seminar. Aug. 6, 1951, p. 83-91; P.B. Report No. 111,083, U. S. Dept. of Commerce, OTS, Washington 25, D. C.
Outstanding general characteristics of Ti and Ti alloys. Table, photographs. (Ti)

78-V. (German.) **Tungsten—Its Properties, Use, and Production.** Richard Kerschagl. *Metall,* v. 7, nos. 9-10, May 1953, p. 373-376.
History, properties, ores, uses, occurrence, production, and prices. 27 ref. (W)

79-V. (Hungarian.) **Development of Titanium Metallurgy.** *Kohaszati Lapok (Aluminium),* v. 4, no. 12, Dec. 1952, p. 276-285.
General review. Discusses Ti deposits; methods of Ti metallurgy; physical and mechanical properties of metallic Ti; and some technically important Ti alloys. Tables, charts, diagrams. (Ti)

80-V. (Book.) **Zirconium and Zirconium Alloys.** 354 p. 1953. American Society for Metals, 7301 Euclid Ave., Cleveland 3, Ohio. $7.00.
Consists of 21 papers presented at the Eighth Western Metal Congress and Exposition, Los Angeles, Mar. 23-27, 1953. Individual papers are abstracted separately. (Zr)

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Unusual opportunity for graduate chemical, electrochemical or metallurgical engineer with 5-8 years experience in production of carbon or graphite electrodes or related products. Require man capable growing from initial staff position to line responsibility involving several plants. Prefer age 30-35 and no aversion to moderate travel. Location—Pacific Northwest. Give details on age, education, experience, salary. Box 8-15, Metals Review.

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Exceptional position available in mid-Atlantic location for graduate electro-chemist or chemical engineer in nationally known nonferrous metals company. Engineering or supervisory experience essential in production of chlorine or inorganic anhydrous chlorides, and/or electrolysis. Reply confidentially, giving age, education, experience, and salary expected. Box 8-20, Metals Review.

West

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METALLURGIST: B.S. degree, age 39, married, 14 years experience. Familiar with all phases of ferrous metallurgy from melting through finished product. Extensive finished product experience in nonferrous metallurgy, cast iron, toolsteels, etc. Also protective coatings. Desires position in materials engineering and/or development. Cleveland area preferred. Box 8-75.

CHEMIST-METALLURGIST: Ph.D. degree. Extensive industrial experience in nonferrous metals, especially tungsten, cobalt, flake-type metal powders, analytical chemistry and plant control work. Supervisory experience. Presently employed. Desires responsible position with opportunity of advancement. Prefers New Jersey-New York area, consider any other. Married, two children. Box 8-80.

METALLURGIST: Responsible, Carnegie Tech graduate, U. S. citizenship and residence, background in steel, aircraft, carbide-tipped rock drill steel, U. S. and Sweden. Experienced organizer, materials, process development, trouble shooting, industrial experimentation, quality control. Record of accomplishments. Author of several technical articles. Desires permanent position in United States. Box 8-85.

METALLURGIST: Metallurgical problems solved by professor of engineering with long and broad experience in ferrous and nonferrous materials, their casting, working, fabricating and plating. Box 8-90.

METALLURGICAL ENGINEER: With electrical training. B.S. degree. Age 32. General electrical and metallurgical experience in U. S. Army four years. Experience with high-temperature alloys, stainless steels, toolsteels, cast irons, and spring materials. Also welding, drawing, heat treating and plating. Mountain states or West Coast preferred. Box 8-95.

METALLURGICAL ENGINEER: B.S. degree, age 26, married. Experience includes 1½ years in research of steel fabrication, 1 year in aircraft production control of aluminum heat treating and fabrication, steel heat treating, furnace copper brazing, furnaces and associated pyrometers. Desires position in metallurgical technical sales work in Detroit, Mich. Box 8-100.

PHYSICAL METALLURGIST: Recent Ph.D. Some experience in age hardening copper-base alloys, aluminum physical metallurgy, and fabrication of titanium. Several papers published. Desires position in teaching or industrial research. Prefers midwest or Rocky Mountain area. Box 8-105.

METALLURGICAL SUPERVISOR: Equivalent of M.S. degree, married, family, age 34. Thirteen years varied engineering background, including four years university teaching, three years supervisor Atomic Energy Project, four years administrative experience, one year industrial and one year physical metallurgy research. Extensive technical writing experience. Location immaterial, available Jan. 1, 1954. Box 8-110.

METALLURGIST: Graduate M.S. degree, age 43, with 20 years experience in metal fabrication, heat treatment, welding, brazing, machining and forging. Some work in gray iron, brass and aluminum foundry. Selection of lubricants, material and process specification. Publications. Registered engineer. Now chief metallurgist and laboratory director. Prefers midwest location. Box 8-130.

POWDER METALLURGIST: B.S. degree in metallurgical engineering, age 31, married. Ten years industrial experience including supervisory duties. Last six years on research and development of high-density powdered iron structural parts. Desires position setting up and/or supervising powder metallurgy development program. Presently employed. Box 8-135.

PHYSICAL METALLURGIST: Ph.D. degree, age 31, married, children. Adaptable. Desires research or research and development position with metals producing or fabricating concern. At present employed as associate professor of metallurgy and in consulting. Eight years experience in welding research and general physical metallurgy. One year in cold drawn and screw machine products. Box 8-140.

TECHNICAL REPRESENTATIVE: Fifteen years in nonferrous casting field. Desires connection with metal processing companies, specializing in zinc and aluminum die casting, investment casting, plaster mold casting, aluminum and bronze permanent mold and sand casting. Experienced sales manager with engineering and foundry experience entering representatives field in Indiana and Illinois. Well acquainted with these states. Box 8-145.

Invitation to Entrants

8th metallographic exhibit

Entries are invited in the 8th Metallographic Exhibit, to be held during the National Metal Exposition in Cleveland the week of Oct. 19 through 23, 1953. Entries will be displayed to good advantage and awards will be given for the best micrographs as decided by a competent committee of judges.

CLASSIFICATION OF MICROS

1. Toolsteels and tool materials
2. Stainless steels and heat resisting alloys
3. Other steels and irons, cast or wrought
4. Aluminum, magnesium, beryllium, titanium and their alloys
5. Copper, nickel, zinc, lead and their alloys
6. Metals and alloys not otherwise classified
7. Series showing transitions or changes during processing
8. Welds and other joining methods
9. Surface phenomena
10. Results by unconventional techniques (other than electron micrographs)
11. Slags, inclusions, refractories, cermets

RULES FOR ENTRANTS

Work which has appeared in previous metallographic exhibits held by the American Society for Metals is unacceptable. Photographic prints shall be mounted on stiff cardboard of maximum dimensions approximating 15 by 22 in. (14 by 18 in. for entries from outside U.S.A.). Heavy, solid frames are not permissible because of difficulties in mounting the exhibit. Entries should carry a label giving:

Name of metallographer
Classification of entry
Material, etchant, magnification
Any special information as desired

Transparencies or other items to be viewed by transmitted light must be mounted on light-tight boxes wired for plugging into lighting circuit, and built so they can be fixed to the wall.

Entrants living outside the U.S.A. should send their micrographs by first-class letter mail endorsed "May be opened for customs inspection before delivery to addressee."

Exhibits must be delivered between Sept. 25 and Oct. 15, 1953, either by prepaid express, registered parcel post or first-class letter mail.

Address: Metallographic Exhibit
American Society for Metals
7301 Euclid Ave.
Cleveland 3, Ohio.

AWARDS AND OTHER INFORMATION

A committee of judges will be appointed by the Metal Congress management which will award a First Prize (a medal and blue ribbon) to the best in each classification. Honorable Mentions will also be awarded (with appropriate medals) to other photographs which, in the opinion of the judges, closely approach the winner in excellence.

A Grand Prize, in the form of an engrossed certificate, and a money award of $100 will be awarded the exhibitor whose work is adjudged best in the show, and his exhibit shall become the property of the American Society for Metals for preservation and display in the Society's headquarters.

All other exhibits will be returned to owners by prepaid express or registered parcel post during the week of Oct. 26, 1953.

35th National Metal Congress and Exposition

Cleveland, Ohio • **OCTOBER 19 to 23, 1953**

15 TYPES
INDUSTRIAL POT FURNACES . . .
GAS - OIL - ELECTRIC.
SALT BATH CONVEYORS.

HOLDEN
METALLURGICAL PRODUCTS
TRADE MARK REGISTERED

50 SALT BATH
COMPOSITIONS FOR ANY
HEAT TREATING APPLICATION.
BLACKING BATH.

NEWS!!

A new Austempering-Martempering Quenching Salt

Holden Marquench No. 296

Useable quenching range—350-700° F.

This product contains a chloride coagulant which separates out the chloride content in your salt bath into an easily removed slurry. Contrary to normal sludges which currently develop in the average marquenching austempering operation, this slurry or chloride sludge is easily removed and is not re-assimilated by the salt bath during your quenching operation.

HOW TO USE

1. If you are now using a nitrate quenching salt, you will advise us how many pounds of quenching salt is in your austempering-martempering furnace.

2. We will advise how much Marquench Additive #356 to purchase, which will avoid the necessity of your bailing out the furnace.

In normal operation, four pounds of Marquench Additive #356 will reduce your chloride content from 15 to 7½%. Once the Marquench Additive #356 has reduced your chloride content to the proper level, then additions of Marquench #296 material are made to your bath.

TESTING

No chemical tests are necessary. With our salt bath the normal melting point of salt is 295°F. Sample the quenching bath daily or weekly and allow it to cool and take a melting point test to determine the percentage of chlorides by the change in melting point. If the melting point is 310 or 325, additional Marquench Additive #356 can be added, usually not to exceed four pounds per 100 pounds of salt bath in the pot, and this should settle out the chlorides so that your melting point will be in the 295 to 300 range, which will approximate ½ to 2% of total chloride.

There should be no residual sludge showing in the glass beaker provided the Marquench #296 is properly used or additions of the Marquench Additive #356 are used when required, depending on operating conditions.

IMPORTANT! The advantage of this development is the maximum quenching efficiency of a nitrate-nitrite compound in continuous production without any bail out of material other than sludging.

Write for representative to call on you so you can eliminate bail out and throwing away of quenching salt.

THE A. F. HOLDEN COMPANY

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